



HIGH LIGHTS  
OF GEOGRAPHY  
*EUROPE*

JORDAN AND CATHER



Gertrude H. of Brook-Smyth

May, 1937





# HIGH LIGHTS OF GEOGRAPHY

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## EUROPE

By David Starr Jordan and  
Katherine Dunlap Cather



*ILLUSTRATED*  
*with 9 maps and*  
*with 21 airplane views and*  
*110 other photographs*

Yonkers-on-Hudson, New York  
WORLD BOOK COMPANY  
2126 Prairie Avenue, Chicago

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YONKERS-ON-HUDSON, NEW YORK  
2126 PRAIRIE AVENUE, CHICAGO

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*High Lights of Geography* is designed to furnish to the student a background picture of this world as turned out by the hand of the Creator. The geological story is interestingly told, and the clothing of the earth with plant life and animal life is naturally unfolded. The volume on North America and the volume on Europe tell what nature has done to make a home for us, while it is left to the regular textbooks in geography to furnish the man-made features of these continents. Incidentally, the human side of geography is here and there brought into its relation with natural features. The main purpose throughout the narrative has been to supply many of those high lights not found in other elementary books, which will enliven the study of geography in school and out. The combined experiences of a great scientist, known the world over, and an unusually successful teacher, have made it possible for World Book Company to offer in this series one of its best contributions to its list of "Books that apply the world's knowledge to the world's needs"

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PRINTED IN U.S.A.

## FOREWORD

A GOOD many years ago, when the senior author of this book was a young teacher of science, he used sometimes to cross the Atlantic Ocean for a vacation in Europe with a group of his students. Together, they took long tramps, often over the mountain passes of Switzerland, occasionally to the fjords and waterfalls of Norway as well. During these and later wanderings abroad, he looked upon many interesting and delightful scenes. So, of course, have countless other travelers, who, indeed, have passed along charming ways unvisited by him.


But, being an old-fashioned naturalist and something of a geologist too, he often saw, as it were, with a third eye. Thus certain underlying things of the remote past connected themselves in his mind with the "High Lights" of Europe. History is closely linked with geography, while both history and geography, he feels, rest on geology.

A former student, now his publisher, thinking such points of view worth while, asked for a book along those lines to be used in the schools. It was therefore arranged that the senior author should dictate to a secretary some of his personal recollections and impressions; and after that, Mrs. Katherine Dunlap Cather, a writer for young folks, skillfully filled in gaps and put the unorganized matter into form.

Special thanks are due to Mrs. David Starr Jordan for critical reading of the text in proof, also for certain constructive additions, particularly in regard to "High Lights" with which she is familiar.

DAVID STARR JORDAN

STANFORD UNIVERSITY, CALIFORNIA



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## THE PURPOSE OF "HIGH LIGHTS OF GEOGRAPHY"

GEOGRAPHY can be a source of value and delight to the child that will lead him toward further seeking and knowing of his own volition. It can unlock for him the gate into a realm broad as the universe, one in which he sees the world as a far-extending panorama; and through beholding and understanding the wonders of that world and the pulsing life upon it, he may be quickened with desire to be a worthy factor in its progress. The study of a continent or a country should broaden his vision and make possible a richer life than he can have without a comprehension of the marvelous world in which he dwells. It should enable him to see his own land in relief against the other lands of the earth, and make it possible for him to interpret the physical features of each land in relation to those who have homes among them.

One of the most celebrated American engineers traced to moments of enthusiasm during his early college years his determination to make engineering his life work, for in learning about the physical features of the world he was fired with desire to live and work among them. With others, a similar inspiration and birth of ambition have grown out of the study of geography during high school years. That this inspiration can grow out of geography work in the elementary grades is equally possible. In some cases it has resulted from the work there, because children of initiative and ability have been drawn to seek for themselves along roads to which the classroom work points the way.

In the majority of cases, however, interest and desire have not been aroused to a high pitch, because the subject matter has not been of the type to feed the average child's curiosity. He has had merely a series of effects. We have said to him, "This is so," without answering the ever-present question, "Why is it so?" We have assumed that, in general, causes

vi    *The Purpose of "High Lights of Geography"*

could be made clear only to boys and girls of high school years, and the result has been that the vast company that never reaches high school goes through life without knowing the causes. The satisfaction that comes of comprehending the lakes and rivers and the life of man upon the various parts of the earth is lost to these young people. Yet it need not be lost to them, if only we will set before them the fascinating story of the causes in a form they can understand.

As in the volume on North America, *High Lights of Geography: Europe* presents to the elementary school child, in language that is within his comprehension, not only the physical features of Europe, but an explanation of how those physical features came to be, and their relation to plant and animal life. It does it by the use of narratives, keeping as nearly as possible to story form, which of all types of expression is most appealing and interesting to these young people. Also, it links the physical features with man's beliefs concerning them, so that the boy or girl gets both the scientific account and the explanation of simple men who, having no one to teach them, were yet wondering and striving to understand. For this reason many local legends have been used, accounts of the origin of mountains, lakes, and caves that were long believed by the peasantry in the various parts of Europe. The value of this material lies in its broadening effects upon the child's sympathy and its appeal to his social instincts. The more a person understands of the struggle to discover truth as mankind moved from ignorance toward enlightenment, the more tolerant he is toward his handicapped progenitors and the more grateful that he is privileged to live his life amid the opportunities and light of today.

The outstanding physical features are also illuminated by references to the history that has been enacted near them and the literature they have inspired, and, as much as is

possible in one small volume, they have been shown in various phases of their relationship to man.

More Americans visit Europe than any other continent, and in order to obtain the full value and enjoyment of a trip one must understand Europe. One must see the physical features both in their effect upon the activities of man and in their shaping of the destiny of nations. The more a person understands of them, the more his interest is aroused toward a full comprehension of their meaning in the life of today; and the more clearly he sees them, the more nearly complete will his enjoyment be. George William Curtis, writing of people who go to Italy, once said, "He must have Italy in his heart who sees it with his eyes." That is equally true of Europe as a whole or of any continent. In order to see it in its magnificent perspective, he must have it in his heart. Through knowledge gained concerning it before he sets foot on its shores, he must have a feeling for it. If he knows the fjords of Norway as ancient river valleys that by the work of ice and the subsidence of shore lines became ocean arms, the marvel of the fjords will be greater to him than it can be without that knowledge. His fancy will roam back over their wonderful story and he will think of them as a scene in the stupendous drama of nature which has been enacted ever since the beginning of things.

*High Lights of Geography: Europe* gives to the child this knowledge that fosters feeling and appreciation. It sets before him something of the human drama as well as of the drama of the old world, and through seeing that drama enacted before his eyes, he will be gaining knowledge that will help him to go with understanding and sympathy through life.

KATHERINE DUNLAP CATHER

## ACKNOWLEDGMENTS

The authors are indebted to those whose collections of photographs have contributed to the value of this book, as indicated in the following list.

- Ad Astra Aero, pages 60, 109, 124, 135, 199, 239  
Aerofilms, Ltd., pages 8, 40, 41, 66, 160, 189, 218, 227, 228  
American Museum of Natural History, pages 268, 270, 271, 273, 284, 288, 289, 293, 294, 295, 296, 299  
American Nature Association, page 159  
Central Aerophoto Company, Ltd., pages 27, 230, 297  
Lee S. Crandall, pages 277, 278  
Deutscher Aero Lloyd, page 183  
French Line, pages 192, 221, 240  
Ewing Galloway, pages 3, 24, 29, 33, 67, 73, 82, 84, 88, 94, 95, 137, 141, 150, 156, 168, 171, 177, 184, 187, 201, 204, 214, 216, 223, 224, 234, 235, 281  
Burton Holmes (from Galloway), pages 22, 36, 102, 140, 143, 146, 174  
Joseph S. Illick, pages 254, 257  
International Newsreel Corporation, pages 106, 232  
Keystone View Company, pages 190, 195  
R. H. Markham, page 172  
George Grant McCurdy, from *Human Origins*, page 287, courtesy of D. Appleton and Co.  
Donald McLeish, pages xiv, 10, 13, 79, 107, 112, 119, 123, 138, 162, 213, 243, 244, 259  
Metropolitan Museum of Art, pages 300, 301  
Norwegian Government Railways, pages 16, 101, 248  
Mrs. N. Find Rasmussen, page 21  
E. R. Sanborn, New York Zoölogical Society, page 274  
Swedish State Railways, page 69  
Swiss Federal Railways, pages 51, 127  
Underwood Press Service, page 93  
United States Forest Service, pages 251, 253, 260, 264  
United States Geological Survey, page 76  
Valentine and Sons, Ltd., pages 61, 64, 99  
Wehrli, Ltd., pages 46, 53, 56, 58, 63, 115, 128, 130, 133, 211, 247  
Wide World Photos, page 39



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# PART ONE

HOW THE EARTH WAS MADE



*Donald McLeish*

Rocky summits on which we may read an interesting record of mountain history. Glaciers and frost have been at work here for countless centuries. The glacier that is now moving slowly down the slope is wearing away the mountain sides. If we followed it to its lower end, we should find icy torrents which are the source of some river. And the river is carrying soil fragments to valley and plain and still farther onward to the sea. The photograph shows Mount Pelvoux and the Glacier Noir in the Dauphiné Alps of France, near the Italian border.

# HIGH LIGHTS OF GEOGRAPHY EUROPE

## CHAPTER ONE

### EUROPE'S CHANGING SHORES

#### I. THE SHORE OF SOUTHERN ITALY

IN the far-off land of Arabia, a great many centuries ago, there lived a man named Mohammed Kazwini, who wrote some charming stories about the wonders of Asia. These tales tell of the origin of lakes and rivers, of the coming of winter upon the earth, of the disappearance of cold that marks the approach of spring, and of how mountains came to stand in some places, while there are deep valleys in others. In one of the most delightful of the stories, translated into English by the great British geologist, Sir Charles Lyell, a man named Khidz, who is supposed to be immortal, describes as an eye witness changes that have occurred on the earth since the beginning of things. Here is the story told by Khidz.

One day I passed by a very ancient and populous city and asked one of its inhabitants how long it had been founded.

"It is indeed a mighty city," the man replied. "We know not how long it has existed, and our ancestors were on this subject as ignorant as ourselves."

Five centuries afterward, when I visited the same place, I could not perceive the slightest vestige of the city. I demanded of a peasant gathering herbs upon its former site how long it had been destroyed.

"That is a strange question," replied he. "The ground here has never been different from what you now behold it."

"Was there not of old a splendid city here?" I asked.

"Never," answered he, "so far as we have seen, and never did our fathers speak of such."

At the end of another five hundred years I went again to the same place, and where the man had gathered herbs the ocean rolled. On its shore was a party of fishermen, of whom I inquired how long the land had been covered by the waters.

"Is this a question for a man like you to ask?" said they. "Always this spot has been what it is now."

Again at the end of five hundred years I returned to the place, and the sea had disappeared. A man stood alone on the spot. I inquired of him how long ago this change had taken place, and he gave me the same answer I had received before.

Lastly, on coming back after an equal lapse of time, I found a flourishing city there, more populous and more rich in beautiful buildings than the one I had seen the first time. And when I would have informed myself concerning its origin, the inhabitants answered me, "Its rise is lost in remote antiquity. We are ignorant how long it has existed, and our fathers were on this subject as ignorant as ourselves."

What the old Arabian tale says of the alternate rise and destruction of the city has actually occurred in more than one part of the world. From the very beginning of things coasts have been rising, sinking, and rising again. Rivers, glaciers, frosts, rains, and waves have been tearing land down in one place and depositing it in another, and because of these things the shore of the continents is forever changing. The proof is to be found on cliffs and even buildings in many parts of the world, but nowhere can it be beheld more plainly than along the Mediterranean shore of Italy.

Some seven miles west of Naples, a little bay called Pozzuoli cuts into the Italian peninsula from the Mediterranean. On the shore of this bay, at the town of Pozzuoli,



*Ewing Galloway*

Columns at Pozzuoli on which scientists may read the history of this portion of the Mediterranean coast. These are the remains of what is supposed to have been an ancient temple of Serapis. The little holes on the columns were made by sea animals in the days when water covered this region.



The Mediterranean shore at Pozzuoli in southern Italy, where, through the ages, the land has been rising, sinking, and rising again. The three columns of the temple of Serapis may be seen at the left side of the picture. (From a photograph of 1875.)



are to be seen the pillars of an ancient shrine, known as the temple of Serapis, built long before the dawn of Christianity. To the scientist it is a great history book, for upon its pillars he reads a tale of strange happenings.

In the far-off centuries the temple of Serapis was an imposing structure consisting of a square court inclosed by forty-eight massive marble and granite columns. Most of the beautifully hewn pillars are now under water, and the ones exposed to the sun and wind are pitted with the borings of shellfish. As such creatures live only in the sea, we know that at some time the waves flowed over the entire ruin. But history tells us that this was dry land when the temple was built.

Therefore it is believed that the shore upon which the temple of Serapis stands was at some time submerged, perhaps during a period of earthquakes and volcanic eruptions. Then, during some later disturbance, the land was lifted again, after the fashion of the mythical city of which Khidz tells.

Since the beginning of the Christian era, the level of the land at Pozzuoli has changed twice, being submerged from twenty to thirty feet, then raised. We know the distance by the height of the borings in the pillars and on the cliffs southeast of the town, which as far up as thirty feet are perforated with holes drilled by boring sea animals.

At many other points along the Italian coast, in the vicinity of Pozzuoli, one can see evidences of changes in land and ocean levels that have occurred since the coming of man upon the earth. About ten miles northwest of the temple of Serapis are the ruins of two other ancient temples, one built to Neptune, the sea god, one to the nymphs that the Romans believed filled the groves and fields with song. In the olden days both of these structures stood high and dry on the shore, but now they are partially under water.

At Sorrento, on the southern shore of the Bay of Naples, are the ruins of several Roman buildings, all of them under the waves. And if you sail across the bay to the island of Capri, you will see the remains of a palace now covered by water. Inscriptions on a column tell that it was built during the reign of the Emperor Tiberius, and since that ruler lived in the time of Christ, less than two thousand years have gone since the palace became submerged.

In still another place near Naples are two ancient roads now under water, magnificently constructed highways of rock from the Apennines, built at a cost of much gold and the labor of thousands of slaves. Once they echoed to the tread of conquerors, and over them rumbled the war-wagons of the Romans. But today the waves dash above them, although in the long ago they were well back from the water.

Not far from the ruins of the temple of Serapis are the remains of a pier of twenty-four arches, along which men and women of ancient times moved down to boats to embark on voyages, or to dive in the cool surf on sweltering summer days. Three of these arches are now under the sea, submerged like the temples and the two ancient roads.

No matter in what direction from Naples one follows the shore, one is sure to find evidences of changes in the level of coast lines, not only in the ruins of buildings and roads, but upon some of the hills and cliffs. Near Monte Nuovo, a volcanic knoll a little to the north of Pozzuoli, there is a low plain called La Stanza. This is made up of strata, or layers of rock, through which are scattered shells and other remains of sea animals, telling us that this plain was formerly under the sea, and that during some disturbance it was raised.

All these evidences of lifted or sunken coast lines along the Italian shore lead one to wonder what brought the changes

about, what kind of disturbances were great enough to cause changes in the level of shore lines. We know that a large part of the Mediterranean country is a volcanic region, a place where for ages heat forces have been at work and various eruptions have occurred. Many of the volcanoes of Italy are now extinct, but they were very active in the long ago, and in the days when they sent out lava some amazing things happened to the coast. Earthquakes, too, have been frequent in Italy and have helped to change the level of the shore line. There have been many local earthquakes or steam explosions in and about volcanoes; and earthquake disturbances in no way connected with volcanoes but due to strains on the earth's crust have had a still more active part in the shifting of coast lines.

During some of the earthquakes and volcanic eruptions the land has sunk. During others it has risen. Monte Nuovo, the hill that rises above La Stanza, was upheaved in an earthquake four hundred years ago, and several other knolls and ridges in the vicinity of Naples originated in the same way. So you see that through the various disturbances the level of the shore line of southern Italy has changed almost as strikingly as the land and sea described in the old Arabian tale.

## II. THE ADRIATIC COAST AND THE ORIGIN OF VENICE

Along the northeastern coast of Italy, at the head of the Adriatic Sea, the shore line has been changing through the centuries because of being built up by the combined work of rivers and ocean. Streams flowing down from the mountains carry large quantities of sand, which is thrown back by the waves and deposited along the river mouths. In this way, for a distance of almost three hundred miles between Trieste and Ravenna, a series of sand bars and islands has been formed by deposits from the Po, Adige, Isonzo, and other rivers.



*Aerofilms, Ltd.*

Airplane view showing a coast region that has been gradually built up by sand and clay brought down by streams and thrown back by the waves. The photograph shows the mouth of the Var River near Nice, on the Mediterranean coast of France.

At first after the sand bars are formed, shallow bays or sounds lie between them and the mainland, but as deposits gradually pile up, they become more and more shallow, until they become part of the land as low marshes.

Sand bars have been built so rapidly along the Adriatic coast that ancient seaport towns are now miles inland. One of these is Adria, from which the Adriatic has its name. During the reign of Augustus Cæsar, which ended fourteen years after our Christian era began, Adria was an important harbor. But the Po, carrying sand and clay, has extended its delta far beyond the old shore line, with the result that what was a seaport of the Romans is thirteen miles inland now. Ravenna, about fifty miles south of Adria, was also a seaport. It is five miles back from the coast today.

Venice, the queen city of Europe during the Middle Ages, from whose wharves merchant galleys sailed to every port then known, owes her origin to sands carried down by the rivers. Accumulating along the coast from time immemorial, these deposits formed a group of low islands with lagoons, or shallow water channels, between them. Upon these islands a settlement grew; and as the population increased and more space was needed for house building, wooden piles were driven into the lagoons, upon which stately palaces were erected. So Venice became a city with narrow sea arms between the lines of houses, with canals for streets and a sea for her public playground; and because of her position, during the Middle Ages she grew to be the greatest commercial center of Europe.

Once each year, when Venice was in the noontide of her greatness, her duke, or Doge, and the Council of Ten, as her law-making body was called, moved in state to the water's edge for the ceremony that was known as the Marriage of Venice. The Bride of the Adriatic, they said she was; and it was little wonder, for the Adriatic bore her bright-sailed galleys toward lands from which they brought



*Donald McLeish*

Venice, the city built on islands of sand, with canals for streets. The beautiful palace of the Doges is seen at the center of the picture. From this water front sailed the merchant galleys that brought back to Venice the treasures of all the world. The mainland of Italy shows as a faint line in the distant background.

back wealth. And the waves of the Adriatic, piling up the sands and clay the rivers carried down, made her very foundation. Therefore these ruling citizens threw a golden chain into the water, in token that they gave her in marriage to the sea which was the source of her wealth and her very existence.

But the building of sea and river, that made possible the beginning of Venice, finally caused her decay. Sands borne from the Italian hills made her harbor shallow, and as modern, deep-hulled vessels came into use, they could not get up to her wharves. So she began to decline, for the galleys that had brought her wealth during the Middle Ages could not compete with the great merchant ships of the seventeenth, eighteenth, and nineteenth centuries, and the glory of Venice became a thing of the past. But still she sits

there on her islands, her time-stained palaces and marble halls memorials of her splendid history.

### III. THE STORY OF BRUGES

Far north of Venice, in a region that is today a part of Belgium but of old was known as Flanders, stands Bruges, a city with a history in many ways like that of Venice, and during the Middle Ages her commercial rival. The story of Bruges begins with that of a powerful northern chief, who, because of his fierceness in battle and the heavy iron armor he wore even in days of peace, was called Baldwin Bras de Fer (Arm of Iron). He wedded Judith, daughter of Charles the Bald, Emperor of France. Just before his marriage to the princess, her father was deeply distressed. The Norsemen, sea rovers from Scandinavia whose oared galleys were then moving to every part of the known world, had come up the Loire and Seine rivers, attacked Rouen and Paris, and threatened to possess the land of France. Therefore Charles called to his soldiers and vassals to help him, and among the latter was Baldwin of the Iron Arm, head of a tribe in Flanders. More than all the other chiefs combined, he helped to overcome the Norsemen. Thereupon the emperor, in gratitude for this service, made him Forester of Flanders, a sort of governor or under lord in his native country, over which Charles exercised the rights of king.

When Baldwin married Judith, they rode northward together through the pleasant forest land. On the Zwin, a river up which the largest boats could come, they built a fortified castle, and within the walls inclosing this castle a settlement grew. They called it Bruges, and as time passed it steadily gained in importance.

The people of Flanders were the master weavers of the world of that day, and as boats from Bruges went to far lands, they bore woven stuffs to exchange for gold. Be-

cause of their beauty, the velvets, linens, and laces from the Flanders looms were prized in every country. Vessels from distant ports came with cargoes to exchange for them, galleons laden with perfumes from Arabia, wool from Bulgaria, spices from India, marble from Italy, and honey, wax, and crystal from Portugal and Spain. Sometimes as many as a hundred ships were moored to the Bruges docks in one day, and went out again bearing chests worth the fortune of a king.

The woven stuffs of Bruges and her unusual shipping facilities made the city so prosperous that her women dressed in rich velvets, laces, and satins. In the latter part of the thirteenth century Joanna of Navarre, wife of Philip Valois, King of France, who visited the city, was filled with envy at the sight of the gorgeous apparel of the wives and daughters of the weavers and cloth makers.

"I thought I alone was queen," she exclaimed, "but here I have six hundred rivals!"

But for Bruges, as for Venice, the day of glory ended. Toward the close of the fifteenth century the Zwin began to fill with sand. Argosies that had brought priceless cargoes from the four corners of the world could no longer reach her docks, for with the incoming sand the channel became more and more shallow. The great merchant fleets that had borne supplies to Bruges and carried her woven stuffs to distant lands sailed to other ports, and because the weavers lacked a market, they no longer had the great incomes that had been theirs in the past. Many of the most skillful workmen emigrated to England, and the craft of cloth weaving and lace making in Flanders declined.

By the end of the seventeenth century Bruges had fallen into decay; her rich families sank to poverty, and some of those whose fathers had been merchant princes were forced to eat the bread of charity. The fair capital that



*Donald McLeish*

Bruges, the city of bridges, in Belgium. A hundred ships a day used to moor at her docks before the sands filled up the channel and cut her off from the sea.

had been the pride of the northern world came to be called Bruges la Morte — the Dead. And nearly dead she was, as compared with her former greatness. Yet Bruges is still an interesting and beautiful place, because of her fine buildings and the ancient Cloth Hall with its famous bells

in a picturesque belfry, although her glory is all in the past, because of sands that closed her channel.

#### IV. THE SHORE OF NORWAY

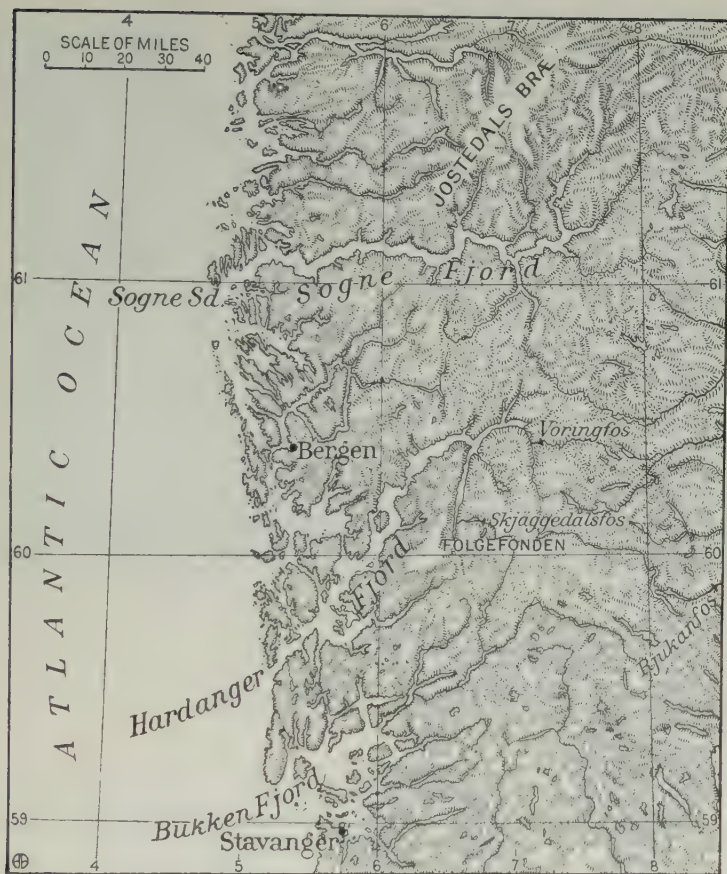
Indenting the shore of Norway are many long, narrow bays, hundreds of them, shaped like giant fingers, and lying so close to one another that on a map the coast looks fringed. These bays are called fjords. Once they were not bays at all, but valleys through which rivers flowed to the sea. During the great glacial times, when much of Europe was buried under thousands of feet of snow, the ice scoured out and deepened these valleys. When the ice melted, the sea flowed into the valleys, making the fjords we know.

In no other part of the world is there more magnificent scenery than that of the fjords of Norway. Some of the ice-carved bays are very deep and narrow and often they are very long. The Sogne Fjord, one hundred and thirty-six miles long, is the largest in the world. It is bordered in part by cliffs rising even to six thousand feet in height and inclosed by rugged mountains. Scattered along its banks are several towns, mostly placed where schools of herring come near the shore, for in this region the chief means of livelihood is fishing, and villages spring up almost over night with the appearance of fish schools.

One of the loveliest of the bays of Norway is Hardanger Fjord, "the wondrous beautiful Hardanger," as the peasants who live beside it say. At the head of the fjord lies the quaint village of Odda, where the much-prized Hardanger lace is made in the bright-painted cottages.

Hardanger Fjord is seventy-five miles long, and down its banks come foaming rivers and rivulets tumbling to the sea. Where the largest of these streams descends the crags, it makes a splendid waterfall called Vöringfos, leaping almost six hundred feet into a wild chasm. A huge snow





A portion of the coast of Norway not far from its southern tip. It is a mountainous country with fjords cutting deep into the land. Compare this map with the photograph on page 16, which will help you to see how the coast of Norway really looks. The map shows the location of three famous waterfalls (*fos* means fall. See page 246). It shows also two great snow fields, which are the source of many of the glaciers of Norway (see page 151).

field with its glaciers covers the jagged slopes of this fjord, and here and there between the white masses are tiny farm plots and peasant huts with roofs of turf, upon which grow bluebells and other gay-colored flowers.

*Norwegian Government Railways*

Sogne Fjord, which runs 136 miles into the coast of Norway, most of the way between high, rugged cliffs. In ancient times there was a river valley here. A great glacier moved through the valley cutting deep into the land, and then, centuries later, the land sank and the sea flowed up into the valley, making the fjord with its mountainous walls.

Besides Sogne and Hardanger, the coasts of Norway have other finger-shaped bays, every one of them beautiful, and all have played an important part in the history of that land. It was along the fjords that the Norsemen lived — Vikings, they were often called, vik being an old name for fjord. From the shores of the fjords they went forth in open boats propelled by oars and sails to explore and conquer. They fared to Britain, to France, and even to the shores of Italy, and the most daring of them pushed across the Atlantic to Iceland. Some of the boldest who lived on that far western island sailed to Greenland and probably to the northeastern part of the United States, which they called Vinland. It is interesting to think that

the sons of Norway trod our shores perhaps four hundred years before Christopher Columbus came to America.

#### V. THE ORIGIN OF THE ZUIDER ZEE AND THE ISLAND OF ZEALAND

The peasants of Holland declare that in the place now filled by the shallow waters of Zuider Zee there was once a populous valley, and that the ocean came in and covered it because of the selfishness and greed of a woman. The Lady of Stavoren this woman was called, from the name of the city in which she lived, and she was a powerful personage, with ships at sea and houses upon the land, and a wealth of jewels, silks, and satins. But she was as selfish as she was powerful, and always yearned to become richer still.

One day she ordered the captain of her largest vessel to sail out and bring back the richest cargo in all the world. And the captain, thinking nothing could be more precious than wheat, sailed across the Baltic to Danzig and bought a vast store of German grain. But when he put into the port of Stavoren, the lady was wild with anger.

"Wheat!" she screamed. "I told you to bring me the most precious thing in the world, and you fetch only grain from the meadow. Throw it into the sea!"

Horried at such a command, the captain pleaded with her not to destroy precious food when there were many hungry mouths in Stavoren. But she shrieked at him, "Do as I bid you!"

Now the captain, who could not bear the thought of giving to the waves wheat that was needed by the poor, sent a messenger abroad saying, "The Lady of Stavoren will not have the grain we have brought back from Danzig, but if you ask her perhaps she will divide it among you."

Therefore the unfortunate of the city approached her house with pleas; but she drove them away, hurried down

to where the ship was anchored, and threatened to punish the sailors if they did not empty the cargo into the waves. So there was nothing for them to do but pour it down.

"Oh, my lady!" the captain exclaimed, as sadly he watched the wheat sink into the water, "a day will come when you will be sorry for this. You will know a time when you will be as hungry as those who now weep here, and no one will pity you."

Sneeringly she retorted, "I am richest of all the rich of Stavoren. 'Tis impossible that I shall ever be hungry."

But it proved to be even as the captain had foretold. That very afternoon word came of the destruction of the lady's ships at sea. Then her treasure chests were pilaged; and because she had no money left to pay taxes to the king, her houses and lands went too. Instead of being the richest woman in Stavoren, she was as poor as any beggar, but no one would help her. The other rich folk were selfish, as she had been, and the poor had neither food nor money to spare.

Then one night a strange thing happened. The ocean swept in and covered the houses, and when morning broke over the northern world the Zuider Zee rolled above the roofs and towers of Stavoren.

It rolls there still. Some of the peasants say that even now when the weather is fine and the water as smooth as glass, they see spires, domes, and stately columns under the water. And sometimes music like the sound of distant bells falls upon their ears. Then they look and listen and nod to each other, believing they hear the chimes of Stavoren Town, once the fairest city of Holland.

It is not only peasants who say that the sea covers what was once the home of people. Geologists believe that until as late as the twelfth century what is now the Zuider Zee was a valley. Then, because of the gradual sinking of the land, the ocean flowed in and made that region as we



find it now. Old records tell that many towns were destroyed when the waves swept over the country, not so swiftly as in the story of Stavoren, but just as completely.

What is now the North Sea was formerly a broad valley, as once upon a time the Zuider Zee was, and it came to be covered with water in the same way, by the sinking of the land. The thrifty Dutch people have, however, reclaimed their lands by building dikes or dams to shut out the sea, and then pumping off the salt water, which is ruinous to crops. Already the Zuider Zee is being treated in the same way, and the land over which its waters roll will probably be reclaimed within the next thirty years.

East of Denmark, between the Kattegat and the Baltic Sea, lies the large island of Zealand, which, according to an old legend, was not always an island. In ancient times, the people there say, Norway, Sweden, and Denmark were one unbroken stretch of land. Norsemen from Sweden kept going over into Denmark, despoiling the country and causing much sorrow; and Gefu, a Danish goddess, determined to keep them out. She got permission from the Swedish king, Gulfe, to own as much land as she could plow around with four oxen. Then, seeing a way to be free from the Norsemen, she went to work with a vim, plowing for days and nights, until she made a deep ditch around a large tract of land. The sea flowed in and separated it from the mainland, and thus Zealand came to be an island.

This legend has a background in fact, for geologists know that Zealand was once part of the mainland. During the last twenty centuries the coast of Denmark has greatly changed in many places, bits of shore having been separated from the mainland and become islands. And gradually, because of the gnawing of the waves, aided possibly by the sinking of the land, some of the islands have grown smaller, while others have entirely disappeared. Pliny, the Roman naturalist who lived in the first century A.D., left



an account of his travels along these shores, in which he speaks of twenty-three islands skirting the Zuider Zee and the mouth of the Ems. Today there are about fifteen. At some time in the not very remote past they were all part of the mainland to the south, and they became separated from it through the same causes that made some of the islands disappear entirely. (The map on page 104 will help you to locate the places named here.)

The most noted island between the Zuider Zee and the mouth of the Elbe is Heligoland, really two islets, although formerly it was one large body of land. About two hundred years ago, during a disturbance within the sea, the land was divided, and afterward there were two islands instead of one.

Heligoland is noted for its fine harbor. An indentation into the larger of the two islets forms a bay so deep that within it the largest ships can ride. One of the most important naval battles of the World War took place here. At the close of the war it was here, and in the waters just to the east, that the German fleet massed preparatory to sailing out to surrender.

Among the multitude of sand islands between the Zuider Zee and Denmark, near the coast of Schleswig, is a small island called Nordstrand. Three hundred years ago it was a peninsula on the mainland, and was a highly cultivated and populous district. But gradually the waves cut a passage through and made it an island. Because of the continued gnawing of the sea, it is steadily growing smaller. Some day it will disappear entirely perhaps, with all the rest of this long series of islands, built up and again worn down by the North Sea.

On Stevns Klint, a cape on the east coast of Zealand, is a line of cliffs of which the upper part is composed of hard limestone, while the lower portion is of soft chalk. Near the outermost point of the cliffs stands a little church which



*Mrs. N. Find Rasmussen*

On the east coast of the island of Zealand in Denmark, where the sea is steadily eating away the soft cliffs. This church "moves a henstep nearer the brink every year." But it is the brink that really moves as its edges are cut away.

each year gets nearer the edge. The waves keep hollowing out the chalk under the limestone, so that from time to time portions of the hard shelf break off. Thus the church comes to be nearer and nearer the brink. It was closed in 1910, for fear it was going to fall into the sea, and is now only two and a half yards inside the deepest incut of the cliff. The people of that region say the church "moves a henstep nearer the brink every year."

## VI. THE FIRTHS OF SCOTLAND AND IRELAND'S BAYS

The bays indenting the coast of Scotland — called firths by the people of that land — are also fjords, not so long as those of Norway, but formed in the same way, being ancient river valleys that were deepened by the ice and finally invaded at their mouths by the ocean.

*Holmes, from Galloway*

The castle at Edinburgh, Scotland, once an important stronghold because of its commanding position above the Firth of Forth.

Solway Firth, largest of all the Scottish firths, is thirty-six miles long and twenty-two wide at its mouth — only about a fourth as long as Sogne Fjord on the Norwegian coast. But most of the bays of Scotland are large enough to admit sea-going vessels, and they have made possible an important commerce.

They have helped to make history too. Edinburgh, now a fine city, was once just a fortified castle, established at the beginning of the seventh century by Edwin, King of Northumbria, who thought to build on a rock overlooking the Firth of Forth a stronghold so mighty that the most powerful foe could not take it. He called it Edwin's Burgh, or castle, and the early history of Edinburgh is the story of the struggles of chieftains holding the place against those who hoped to capture it.

It is the same with most of the other firths. During the days when men thought they had a right to possess whatever they could take, bands of sea-rovers thirsting for plunder roamed these bays. Many a chapter in Scotland's history might have been very different had not glaciers cut out the coast line, making it quite unlike what it would have been without the action of the moving ice. Every coast line scoured by glaciers in either the northern or the southern hemisphere is marked by these narrow, deep, polished bays, which warmer regions do not possess. Of such nature are some of the best harbors of the world.

The great harbors of northwestern Ireland are also fjords, having been formed, like those of Scotland and Norway, by moving ice scooping out river beds. In Ireland, however, the fjords do not have such lofty banks, for the country is not so mountainous.

Most celebrated of the Irish bays are those of Galway and Dublin, which have played an important part in Ireland's history. Galway Bay had much to do with making Ireland a commercial power during centuries past, for the greatest glory of this region lies in the long ago, and the shipping trade made possible by Galway's broad channel contributed largely to the upbuilding of that glory.

In olden days the town of Galway was one of the famous ports of northern Europe and carried on a lively commerce with Spain. So many Spanish merchants, sailors, and fishermen settled there that at one time a fourth of the population was pure Spanish. These men from the south of Europe lived on year after year, mingling and marrying with the Irish people until the Spanish element came to be very strong throughout Ireland. A large portion of the Spanish Armada, the fleet of ships that was once the mightiest of Europe until it was defeated in 1588 by the English navy, was wrecked off the Galway coast, and the survivors settled in the town. They too married with

*Ewing Galloway*

The harbor of Glengarriff, an inlet on Bantry Bay, at the southwest end of Ireland. This is one of the beautiful bays along the coast of Ireland, dotted with islands large and small.

the Irish, and further increased the Spanish element in the population.

On the east side of Ireland is the storied bay of Dublin. The city of Dublin, capital and metropolis of the island, has had a long, colorful history, dating back to the time when, like Edinburgh, it consisted only of a castle overlooking the bay. During the ninth century it was seized by the Norsemen, and in later years was captured and recaptured by various contending chiefs. It grew to be a very beautiful city, and around it have been written both song and story.

As Dublin is the largest city in Ireland, Belfast in the north, on the bay known as Belfast Lough, is the richest and most busy, with its building of great ships and its weaving of countless miles of Irish linen. Londonderry, also in the north, is another famous town. In olden times



it was called Derry, but once when it was besieged by the southern Irish and brought to the verge of starvation, it was relieved by a ship from London, whereupon the grateful citizens renamed it Londonderry. Most of the people of the north of Ireland, in Belfast and the surrounding counties that constitute the province of Ulster, are descended from immigrants from Scotland, folk in many ways very different from the original Irish, who inhabited the three provinces or ancient kingdoms of Leinster, Munster, and Connaught.

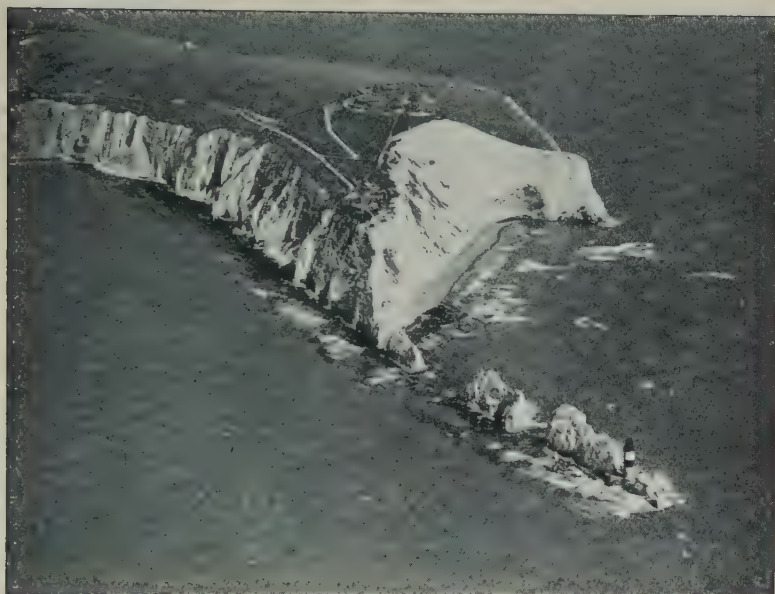
#### VII. THE SUBMERGED FORESTS AND THE CHANGING SHORE OF BRITAIN

Along the coasts of Great Britain there are several forests under the sea, made up of trees ranging in size from small saplings to those from eighteen inches to two feet in diameter. One of these forests is at Cardurnoch, Scotland, on the Firth of Solway. Another is at Swansea Bay, while still another is at St. Bride's Bay, both on the coast of Wales. Submerged groves are to be seen at several places along the Devon shore of England, every one of them telling a story of a changing shore line, just as do the pillars of the temple of Serapis at Pozzuoli.

The outline of the coast of Great Britain has been changing steadily within modern times, in some places because the land has been worn away or sunk, and in other places because the waves have piled up material. At Dunwich, in eastern England, two tracts of land that, according to old records, were taxed in the eleventh century, have now disappeared.

Near the mouth of the Thames, on the Isle of Sheppey there is a church marked on maps of two hundred years ago as more than a mile back from the water. Today during high tide the waves reach its lower windows, and at the present rate of erosion of the coast, it will be but a short time until it disappears. So many proofs are found along the southeast





*Central Aerophoto Co., Ltd.*

Airplane view showing how the sea is cutting away the white chalk cliffs along the south coast of England. The line of pointed rocks running out to the light-house gives some idea of the amount of material that has been washed away. This group of rocks, called the Needles, extends into the English Channel off the Isle of Wight.

A famous example of the effects of the continued wash of waves is shown in the long white walls of chalk on the south coast of England, rising to their highest point in the cliffs of Dover. Because of these white cliffs the Romans called Britain Albion, from the Latin word *albus*, meaning white. The rocks of these cliffs are made up of the shells of vast numbers of microscopic animals. Most of the shells were composed of whitish, limy substances, and it is these that make the largest part of the white chalk rock. But some of the animals had shells of harder materials. These often collected together and formed the hard flint nodules, or lumps, found scattered throughout the chalk.

While the cliffs about Dover are being slowly worn away, the neighboring bay of Romney is filling up with deposits, so that it may no longer be counted among the Five Ports ("Cinque Ports," in Norman French) of southern England. Says Longfellow in his poem, "The Warden of the Cinque Ports":

Sandwich and Romney, Hastings, Hithe, and Dover  
Were all alert that day,  
To see the French war-steamers speeding over,  
When the fog cleared away.

On the Cornwall shore of southwestern England, there is a curious rocky islet called St. Michael. Tradition says that here lived in ancient times the giant Cormoran, who was the terror of all England until he was put out of his wicked business by Jack the Giant Killer.

Another legend states that once upon a time Mount St. Michael was not an island, but a rocky knoll in the center of a forest-covered territory. Men who have studied the English coast believe the story is true. Even now it is an island only during high tide. When the tide is low, the rock ridge connecting it with the mainland is uncovered, making a passage across which one can walk.

### VIII. THE BAYS OF DALMATIA

On the coast of Jugo-Slavia, across the Adriatic from Italy, is a series of rocky islands with numerous channels separating them from the mainland of Dalmatia. These islands represent the tops of rather low and interrupted ridges, much like the folded Appalachians of Pennsylvania. Most of the channels are navigable for steamers, and a number of small seaports have grown up on the bays in this region. But as these bays are short as a rule, and the land behind them is very precipitous, they have little importance to commerce.

*Ewing Galloway*

Gravosa Harbor on the coast of Dalmatia, near the city of Ragusa. When the land sank long ago, the sea ran up an old valley, making this sheltered bay.

Largest of the Dalmatian bays is Cattaro, with its ancient city also called Cattaro, built centuries ago by the Romans. To the north is the bay of Gravosa, or Gruz, near which is situated the old walled town of Ragusa, rich in memories of the glorious past. In olden times Ragusa was the capital of a prosperous, well-regulated republic and the home of a contented people. Then it was subjugated by Rome, by Venice, and by other predatory neighbors, like great greedy eagles swooping down on smaller birds. Ragusa has one of the most delightful climates in the world, for the mountains behind it shut out all sharp winds. It has long been a favorite winter resort.

Spalato, wedged between mountains and sea, is another Dalmatian town of great scenic and historic interest. This too shared the fate of Ragusa and its neighbors in being



conquered by stronger powers. Many buildings erected during the Roman period are still standing, and these, with others built by the Venetians and the Turks, give the ancient capital a most picturesque appearance. On the shore front rises the majestic palace of the Roman emperor, Diocletian, who had his favorite residence here. It is the most splendid monument of the past on the entire coast of Dalmatia, and one of the largest Roman buildings in all Europe.

Farther north on the Dalmatian coast is Zara, a very old city like Ragusa, in ancient times inclosed by a wall that has for the most part been torn away to make room for modern streets. Centuries ago Zara was a free city. Then it was conquered by the Romans, the Venetians, and the Turks, and during the Middle Ages it had a hard time indeed. Early in the nineteenth century it came under the dominion of Austria and continued subject to that country until the close of the World War, when Dalmatia was divided between Italy and the new country of Jugo-Slavia, and Zara fell to Italy's share.

North of Zara, on the coast, is another ancient town, Pola, notable for its huge old Roman amphitheater. Traces of Roman, Venetian, and Turkish occupation are to be seen almost everywhere along the bays of Dalmatia, because these deep and narrow harbors made it easy for the fleets of nations bent on conquest to come in and obtain a foothold.

## IX. THE ISLES OF GREECE

Scattered through the Ægean Sea to the south and east of Greece are a multitude of stony islands with straggling forests of oak, chestnut, plane, and other trees. One of the largest of these is Eubœa, due east of Greece, and so close to it at one point that a bridge has been built across the channel separating them. Some geologists assert that the island was formerly part of the mainland, having been separated from it by an earthquake.



Map of the eastern Mediterranean countries of Europe — Jugo-Slavia, Albania, Rumania, Bulgaria, and Greece. Notice the coast line of Greece and her outlying islands. Jugo-Slavia includes Dalmatia, Bosnia, Serbia, Montenegro, and part of Macedonia. Turkey holds a small area in Europe along the Sea of Marmara and extensive territory in Asia, as shown on the map. Notice the commercial importance of the site of Constantinople. The Danube is the most important river in this section.

Trending from north to south across Eubœa is a range of mountains upon whose highest summits snow lingers throughout the greater part of the year. At the foot of one of these peaks are some celebrated hot springs called

the Baths of Hercules, in which the ancient Greeks declared that Hercules, the demi-god of mighty strength, used to bathe. All up and down the island are glens, mountain crests, and springs which are described in legends of the hero, for according to Greek mythology he was very fond of Eubœa and spent much time there.

At Chalkis, where the channel is about a mile and a half wide, a bridge connects Eubœa with the mainland. The first bridge there was built almost twenty-four hundred years ago, during the war called Peloponnesian, when Athens and Sparta were engaged in a bitter struggle. At that time the Eubœans saw a chance to gain their freedom, and revolted from Bœotia, the Greek province to which they were subject. Thereupon the Bœotians built the bridge, making Eubœa, as they said, "an island to everyone but themselves"; and this gave them a better chance of holding it than when they could reach it only by boat.

Southeast of Eubœa are the many islands of the Cyclades and Sporades, summits of mountains half-sunken in the sea. They all look very much alike, being hard, stony, and covered with low trees. There was a time when they were heavily forested with chestnut, oak, and plane trees; but the rich woodland growth was destroyed by shepherds, who burned it to clear pasture lands, by herds of goats, whose nibbling killed young growths, and by the Turks, who seized Greece and its islands and held them for a long time — and it seems that wherever the Turks have gone they have destroyed the trees.

The Cyclades circle around the island of Naxos, or Delos, as the ancients called it. For a long, long time it was a floating island, they declared. Then the goddess Latona, seeking a place to rest, besought all the islands of the Ægean to shelter her, and was refused by all save Delos. But this island, weeping with pity at her distress, consented to receive the goddess, which so highly pleased Jupiter,

*Ewing Galloway*

The shore of Corfu, one of the larger Greek islands, where the mountains rise like a wall from the sea. The picture shows two beautiful little islets, like those that dot the waters around Greece. They are tops of sunken mountains.

king of gods and men, that he fastened it with strong chains to the bottom of the sea, and ever afterwards it was stationary. While Latona rested on the island, a child was born to her, the marvelous boy who became the sun god, Apollo. Therefore Delos, in the eyes of the Greeks, was sacred to Apollo. The ruins of the shrine they built at which to worship him are still to be seen near the center of the island. Cyclades comes from a Greek word meaning circle, and these islands have their name because they cluster around sacred Delos.

In these eastern Mediterranean waters are many islands noted in history. In the Ægean, near the ancient, storied city of Smyrna, which rises from the sea like a great stadium, are Mytilene and Chios. Largest of all is Cyprus, belonging to England, as does also the fortified island of Malta, which

lies south of Sicily. Northwest of Cyprus lie Rhodes, belonging to Italy, and the Dodecanese, "twelve islands," which belong to Greece.

The Dodecanese group has long been known as the Sporades, a name that comes from a Greek word meaning to sow; and indeed these islands are "sown," or scattered, irregularly through the Ægean. Among them we find the island of Patmos, associated with the name of John, author of the great poem of hope, called the Apocalypse or Revelation. Another island of this group is Nikaria. Here, according to mythology, the boy Icarus met a sad fate. Having learned to fly by means of wings his father made of feathers and fastened on with wax, in his pride he went so close to the sun that the wax melted and the wings came off. Icarus fell into the sea, and his father buried him on the land close by, calling it Icaria in memory of him.

Largest of the Greek islands is Crete, lying in the Mediterranean to the south of Greece. Crete is long, narrow, and very mountainous, with glens so deep the daylight seldom penetrates them, and among its limestone rocks are many caves. The most noted of its sharp peaks is Mount Ida. One of the caves, the Dictæan, the Greeks said was the birthplace of Jupiter, and several others of the caves of Crete are associated with myths of the gods.

To the west of Greece, along the east shore of the Adriatic, lie the famous Ionian Islands, of which lovely Corfu is the largest, and little Ithaca perhaps the most renowned. From Ithaca Odysseus (Ulysses) is supposed to have set forth on his wanderings, as related in the undying epic of Homer, the most eminent of all Greek poets.

Everywhere in the Ægean and eastern Mediterranean islands one finds tales of gods and heroes clustering around the mountains, streams, and ravines, for, according to the belief of the ancients, among the isles of Greece the celestials were at home. Homer speaks of them in the *Iliad* and



the *Odyssey*. Sappho, who lived about six hundred years before Christ, told what the people of that day believed of them, and so has many another writer since that time. Lord Byron describes in beautiful verse the region that was once enchanted land.

The isles of Greece! The isles of Greece,  
Where burning Sappho loved and sung;  
Where grew the arts of war and peace,  
Where Delos rose, and Phœbus sprung!  
Eternal summer gilds them yet,  
But all, except their sun, has set!

In Byron's day it seemed as if the sun of Greece *had* set, for the Turks held the land, and her people were little better than bondmen. But now Greece is free. Her optimistic people believe that her sun is very far from set, and look forward to the time when she will be as much a power in the modern world as she was in that of the ancients.

## X. THE DARDANELLES AND THE BOSPORUS

Two narrow channels separate Asia from Europe, dividing the hills of Thrace in northeastern Greece from the rolling pastures of Anatolia in Asia Minor. The southernmost of these channels is the famous strait known as the Dardanelles.

The Dardanelles with its ancient towns and modern fortifications, the scene of many bloody battles, connects with the Sea of Marmara, a body of water like a vast lake. From its head a narrow strait called the Bosphorus leads to the Black Sea. Flowing down from the east into the Bosphorus is a little stream picturesquely called the Sweet Waters of Asia. In the old Greek story the demi-goddess Io once came down along this stream to the strait and wanted to go across. Finding the current so swift and

*Holmes, from Gulloway*

A view of Constantinople and Galata Bridge. Here and in the city streets one may hear the languages of almost all the world.

strong that even a goddess could not breast it, she changed herself into a heifer and swam over to the European shore. It is because of this old tale that the Bosphorus has its name, for the word means cow ford.

Almost at the point where Io is supposed to have landed now stands Constantinople, for centuries one of the great world capitals. On hills well above the water it is located, on the most beautiful site of any city. It has an excellent harbor, an inlet called the Golden Horn, at the mouth of a little stream known as the Sweet Waters of Europe. This fine harbor should make Constantinople a great commercial city. As a matter of fact, the languages of all civilized peoples, and some uncivilized ones, may be heard on its streets.

Constantinople was once the most splendid capital in the world. It was founded by Constantine, who established the Empire of Byzantium, and was beautified by several rulers who lived after him. Even today, viewed from the Sea of Marmara, a scene more superb cannot be imagined. But when one gets into the town, one finds it utterly shabby. Heavy taxes prevent restoration of buildings. A square mile in the very center has been swept by fire and never rebuilt. The window tax has caused many of the old buildings to be left windowless, and the empty sashes emphasize the general indifference and hopelessness of an over-taxed and ill-treated populace.

Yet, shabby and poor though it is, this eastern capital still possesses some of the noblest buildings in the world. Of these the finest is the great mosque called Santa Sofia, long the center of the Eastern or Greek Church, but now a place of Mohammedan worship. Santa Sofia was built originally by Emperor Constantine. Destroyed by fire some years after his death, it was rebuilt by Justinian, who gave a large share of his private fortune to the work, and drew heavily for it from the public funds. When completed, it was as glorious a structure as was ever conceived by the mind of man. Since that time war, fire, and earthquake have left their marks upon the ancient Greek church and Mohammedan mosque, but after each disaster it has been repaired, and still it stands as one of the most majestic of great edifices. As one writer says, "In after years, in the quiet of the stranger's home, it is the colossal form of Santa Sofia which stands out most distinct on the canvas of Constantinople memories."

During the Middle Ages Constantinople was the center of traffic between the East and the West, and was a vigorous, growing, prosperous city; but for a long time she has been the scene of wrangles of petty officials, of racial hatred and political and commercial rivalries of various nations. In

spite of her beauty and her ancient glory, the historic capital of the Eastern Empire, as Byzantium was called, has not progressed as a modern city. Some day, we hope, she may come into her own again, and this too is the hope of her people and her rulers.

## XI. THE ROCK OF GIBRALTAR

There is a famous rocky promontory on the shore of Spain where, for more than two thousand years, almost no change has taken place, because it is composed of material so hard that the wear of the sea affects it very slowly. This is Gibraltar, the great cliff which guards the Strait of Gibraltar, the narrow neck of water separating Europe from Africa.

Gibraltar was one of "the Pillars of Hercules," as the Greeks called them, the other being the point of the African shore just opposite. All along the eastern Mediterranean, during the golden days of Greece, returning travelers told of the giant rock that, far in the west, rose above the sea like a monster. And, as often happens when a report passes through many mouths, the description came to be so exaggerated that the towering mass was believed to be many miles in height and circumference, although it is, in fact, only two and a half miles long and fourteen hundred feet high. Viewed from the sea, however, it seems much higher, so it is not strange that amazing accounts of it were current during ancient times.

For centuries the ownership of Gibraltar has been regarded as very valuable, because the nation holding it controls the passage between the Atlantic and the Mediterranean. Far back in 711, when the Saracens began their northward dash into Europe, it was captured by Tarik, a Moorish king. He built upon it a strong, fortified castle, the ruins of which still stand. It is from this fact that the promontory gets its name. Gebel-al-Tarik — Hill of Tarik — the people from

*Wide World Photos*

The Rock of Gibraltar as seen from the air. With an area of only two square miles, rising about 1400 feet, it has been for centuries one of the most important fortresses in Europe. Notice the way a harbor has been formed (at the right of the photograph). The roads across the rock and on the lowlands show as white lines in the airman's photograph.

Africa called it, and out of the Spanish corruption of that name we have Gibraltar.

For centuries following the conquest by Tarik, the Moors held the rock, and although Spain made one effort after another to dislodge them, she did not succeed until 1309. Twenty-four years later the Moors captured it again and through siege after seige continued to keep control. In 1462 Spain recaptured it, drove the Moors entirely out of the country, and held the place without further molestation from the people of the south. She was, however, not unmolested by neighboring European powers. During the frequent wars that engulfed Europe, Gibraltar was a prize for which several nations contended, and several times Spain lost it. In 1704 an allied English and Dutch force obtained the much-coveted promontory, and although





Aerofilms, Ltd.

One of the *étangs*, or ponds, along the southern coast of France. The strips of land that inclose the *étangs* have been built up from material washed down by the river and thrown back by the waves. The photograph was taken from an airplane.

Spain made three desperate attempts to regain it, she did not succeed.

Great Britain still holds Gibraltar. She has crowned it with fortifications so mighty that every attempt by a besieging army to take it has failed. It has long been said by military authorities that because of its position above the sea and its strong breastworks, Gibraltar is now impregnable, which means that it cannot be captured.

## XII. THE RHONE AND THE GROWING COAST OF FRANCE

In the vicinity of the mouth of the Rhone River, France extends miles farther south than it once did, because the stream has been pushing a delta out into the sea. It has been building with clay and sand it has brought from the Swiss mountains, until today children play and cattle rove where once the boats of fishermen rocked.

In extending its delta and building up sand bars, the Rhone spread its deposits in such a way as to leave a number of depressions filled with water which became shallow ponds, the abode of frogs and mosquitoes. Some of these ponds, called *étangs*, are large enough for small pleasure launches. Two thousand years ago they were not there. We know this from the fact that Pomponius Mela, a Roman geographer who left a fascinating description of the world of his day, went over this entire region and mapped it. His carefully drawn diagrams show the Mediterranean covering the site of the present ponds.



*Aerofilms, Ltd.*

Airplane view of a section that was formerly an *étang*, near Aigues-Mortes. The *étang* has been largely filled in, making an area of land on which a town has been established (center of the photograph). The Canal des Étangs, over which goods are transported by canal boats, runs diagonally across the picture. In the lower left corner we see the Mediterranean shore. The long process of building up this land has been chiefly the work of the Rhone River, bearing vast quantities of sediment down to the sea.

Even after inclosing the *étangs*, the Rhone did not stop its extension. Farther and farther out it spread its delta, until towns that had been on the shore came to be inland, just as along the Adriatic coast of Italy ports of the past are now several miles back from the sea. Old records tell that Notre Dame des Ports was a harbor in the year 898. Today it is almost eight miles inland. The same records, and some ancient maps, show that Psalmodi was an island in 815. Now it is six miles distant from the sea. The city of Narbonne, at the present time four miles from the coast, was a seaport during the early Middle Ages. Several towns that served as guideposts to Mediterranean sailors when Rome was a nation are now six and eight miles inland. Even within the last two hundred years the Rhone has been building rapidly. A lighthouse tower erected in 1737, known as the tower of St. Louis, is today nearly two miles distant from the water. The shore at this point has been growing seaward at the rate of about a mile every hundred years.

Streams that traverse rocky country carry less sediment than those that flow through sandy regions, and so do not pile up great deposits where they enter the sea. And even though a stream goes through a sandy region and carries a large quantity of eroded material, it does not form a delta if the waves and tides are very high at its mouth, because its sediment is washed far out by the current. It is only in sheltered inland seas like the Adriatic, the Mediterranean, or the Gulf of Mexico, where there is less wave action, that a stream piles deposits along its mouth and changes the shore line.

On the delta of the Rhone is Aigues-Mortes, the City of Dead Waters, an ancient town that is now about four miles back from the coast, but in the thirteenth century was on the seashore. Aigues-Mortes is famed because of its connection with one of the later crusades. In 1248 Louis IX, King of France, determined to lead a crusade against the



The southern coast of France in the vicinity of the Rhone delta, showing how the land has spread out into the sea. It has been built up with materials brought down by rivers. Notice the numerous lakes or *étangs* in the built-up areas. Narbonne, Aigues-Mortes, and the tower of St. Louis were formerly on the shore. Compare this map with the one on page 15, which shows how the sea has cut into the land.

Sultan of Egypt, and he needed a port on the Mediterranean in which to assemble his ships. Not possessing any territory there, he bought from the Count of Provence the land that was afterwards called Aigues-Mortes. For six weeks his camp was pitched on the site of the present town, while the lords who were to accompany him were gathering with their forces. From this port, on a Friday in August, the crusaders put to sea, and to it the survivors returned, after a long period of fighting in Egypt that took the lives of thousands of men and made the king himself a prisoner for wearisome months.

The castle of Aigues-Mortes forms an almost exact quadrangle of chiseled stone and is surmounted by fifteen towers. Excepting the great citadel of Carcassonne, also



in southern France, it is without equal in Europe as an example of medieval military architecture. Upon the order of Louis IX, after his return from the crusade, it was planned and begun by Boccanegra, a famous architect of Genoa. Louis died before it was completed, but several succeeding sovereigns had the work carried on, until it became one of the greatest strongholds of the world.

As centuries passed, Aigues-Mortes, like many other great castles of the past, became a ruin, and today it stands deserted, looking down on the ponds and marshes that lie beyond it to the south. Herders ride back and forth past this City of Dead Waters, following their cattle over the very spot where boats sailed centuries ago.

By all these changes along the shores of Europe, you see that the coast of today is very different from that of several thousand years ago. If we could come back two or three thousand years from now, probably we should find the shore line of that time as different from ours as the one of today is from that of the ancients.



## CHAPTER TWO

### THE WORK OF GLACIERS IN EUROPE

#### I. THE STORY OF THE WANDERING BOULDERS

ALMOST anywhere in Europe north of the latitude of Milan are to be found great rocks, some of which are so large that from a distance they look like castles. Some are rough, while others are smooth. They are called erratics, or wandering boulders, and are scattered very widely, but are most numerous in the region of the mountains.

On the shore of Lake Geneva, in Switzerland, is a boulder seventy feet high. The peasants call it *Pierre de Niton*, and inscriptions upon its sides tell that two thousand years ago, when the Romans marched this way, they used it for an altar. In the city of Neuchâtel, in the western part of Switzerland, is a great rock sixty-two feet high and forty feet across, while others, varying from massive boulders down to pebbles the size of an egg, are scattered for miles and miles around.

For a long time people were at a loss to know where the boulders came from, and the peasants told curious stories about them. Some said they were made by elf folk; some declared they were monsters that had turned to stone. According to still other tales, they were brought from the Alps by a race of giants who peopled that region during the distant past. About a hundred years ago scientists learned that they really had come from the Alps, having been carried by glaciers that moved down from the mountains long ago.

The first man to insist that the erratics of central Europe had been brought by glaciers from the Alps was Charpentier, a French civil engineer. Several others thought it possible, but were not sure. Then Louis Agassiz gave the world the proofs. He verified in detail the Charpentier theory about



*Wehrli, Ltd.*

The Unteraar Glacier, a slow moving river of ice coming down from a mountain of the Bernese Oberland in Switzerland. It is formed by two smaller glaciers, the Finsteraar and the Lauteraar, which meet and run together higher up near the summit. The Unteraar Glacier is ten miles long. Waters flowing from its lower end are the source of the river Aar. The glacier carries down a good deal of loose rocky material, called moraine, shown as dark bands in the photograph.

the origin of the erratics of Switzerland, and proved the same thing about those all over Europe.

Agassiz was a great scientist who was born among the mountains of Switzerland and spent the early part of his life there. From the time he was a small boy, the gullies, cliffs, streams, and animal life of that rugged land interested him intensely. He began to watch and study nature, and nature repaid him by giving him the secret of many of her mysteries. As Longfellow says in a poem he wrote about this famous man :

And Nature, the old nurse, took  
The child upon her knee,  
Saying, "Here is a story book  
Thy Father has written for thee."

And he wandered away and away  
With Nature, the dear old nurse,  
Who sang to him night and day  
The rhymes of the universe.

In 1832 Agassiz was made professor of science in the little university of Neuchâtel. Being in the country of the boulders, he became interested in them and determined to find out about their origin. In order to do this, he built a hut on the glacier of the Lauteraar, a great ice stream that comes down from the Alps in the part of Switzerland that is called the Bernese Oberland.

A glacier moves only a few feet each year, so slowly we cannot see the motion, so it was safe for Agassiz to settle upon one. The Prussian government gave him a fund large enough to cover his living expenses and to buy the materials needed for carrying on his work, and he spent the entire summer there on the frozen mass, studying the rocks and the movement of the ice. He called the little hut *Hôtel des Neuchâtelois*, but it was not a very com-

fortable hotel. It was bitterly cold on the ice, but he stayed and carried on his studies. And by doing it, he learned facts about the movements of glaciers that told him what he wanted to know. He went about it in this way. Digging holes in the ice, he placed a row of upstanding sticks across the glacier. After a time these sticks leaned downward, and those in the middle moved more rapidly than those on the sides. This showed that the top of the ice stream traveled faster than the part underneath, and the central part faster than the sides. It was like the motion of a great sticky mass such as hardened molasses.

Agassiz found also that along the side of a glacier that had been overtopped by cliffs there was a long line of angular rocks. These ranged in size from scraggly pebbles to masses weighing many tons and he discovered that every one of them had fallen from the cliffs of which they were once a part, broken off by the action of frost, by water freezing in the cracks and forcing the rocks apart.

As he examined the rock fragments carried down by the glacier, Agassiz found them to be like the boulders that were strewn in great numbers in the valleys below. This convinced him that the great mass of Pierre de Niton, and the others about which the peasants told curious stories, had been brought from the Alps by glaciers of the past, just as boulders were still being borne down.

From the valley of the Aar, Agassiz proceeded to the valley of the Rhone, at the head of which is the famous Rhone Glacier. This glacier is now only six miles long. But Agassiz found that the frozen stream had at some time reached far down into the lowlands. There were boulders as far away as Lyon, in eastern France, and even beyond that city, which proved that once the end of the glacier had been there.

Throughout the region where wandering boulders are numerous, especially in the valley of the Aar, are dome-



A very broad crevasse in the Swiss Alps. These deep breaks in a glacier add greatly to the dangers of mountain climbing.

shaped projections of smooth rock called *roches moutonnées* — rocks sheeplike — because they look like the backs of sheep lying down. The peasants in the districts where they abounded had as many stories about their origin as about the boulders, but Agassiz decided that they were formed by glaciers moving over their surface, digging out the softer rock and rounding off the harder projections.

These studies convinced Agassiz that glaciers from the Alps once had covered nearly all of Switzerland. The proof lay in erratics that he traced from the Matterhorn, Monte Rosa, the Weisshorn, the Dom, and other peaks, down through the valley of Zermatt. Everywhere were scattered rock masses of various sizes, telling that once ice rivers had traveled that way.

The great scientist now determined to carry his studies into England and Germany, for he knew that boulders abounded in those countries. In England almost every-



where he found glacial drift, as soil left by glaciers is called. This was traceable to the mountains of Scotland and Wales, from which glaciers of the past had carried rock masses as they traveled toward the lowlands.

In Germany he found boulders that had come from the high mountains of Saxony and Bohemia. Strange to say, however, a still greater number had certainly come from the backbone of Scandinavia, and must have been borne or shoved along on the level by vast unmelted masses of ice pressing from behind. Now the fact that in level regions boulders could be traced only to districts farther north, indicated to Agassiz a great general movement of ice from north to south. He came to believe that almost the whole of northern Europe had been covered by a continental glacier, as the northern part of North America had been during the last of the great ice ages.

The great European glacier is supposed to have been deep enough to bury all the mountains of Scandinavia and Scotland, for these heights have rounded summits. In the Alps, however, some of the uppermost peaks are angular and sharp, because here the glaciers did not cover the summits but found their way down into depressions or valleys.

When the young scientist announced that a continental glacier had covered a large portion of Europe, there was an outbreak of ridicule. A comic paper in London published a cartoon showing him and a distinguished professor named Buckland, who had worked with him, down on their knees on London Bridge. They were pictured examining a car track, which they regarded as a glacial scratch, thus trying to prove that at one time an ice stream went over the great arch that spans the Thames River! But ridicule could not silence Louis Agassiz. Ridicule dies after a while, but truth lives always.

It would take too long to tell all the other things men have learned about glaciers and boulders. There are, however, a

*Swiss Federal Railways*

Séracs, or ice pinnacles, on the Pers Glacier in the Upper Engadine, Switzerland. When a glacier turns to go over a steep slope, crevasses open out wide, allowing sunlight or streams of water to enter and widen them further as the ice breaks and piles up. The surface of the glacier may thus become, for a considerable distance, a mass of séracs.

few characteristic points that should be noted. When the ground over which a glacier moves is uneven, the ice mass breaks and develops great cracks called crevasses. These usually extend to the very bottom. Most glaciers carry a long line of rocks which the frost has broken off from cliffs above. Of course, if a crevasse opens, the rocks there fall in and are shoved or rolled along, being thus ground against one another as well as against the hard floor underneath. This grinding wears off all angles, leaving the surface of the boulders and that of the floor polished and marked by parallel scratches, known as *striæ*. If the rocks are rolled over and over, they become both rounded and smooth. Those that ride along on the glacier without falling into a

crevasse remain angular and rough because there has been no friction to polish them.

When there is a sudden and steep drop in the surface over which the glacier moves, a series of crevasses will open wide, and the ice walls will break and pile up in irregular masses. Such ice cascades are called séracs.

It is interesting to note that each glacier has its own individuality, no two being quite alike. Some, the Mer de Glace on the flank of Mont Blanc, for instance, may be crossed without fear. Some are always dangerous for mountain climbers; others are at times unsafe, particularly when crevasses are hidden by new-fallen snow.

## II. THE GLACIAL LAKES OF SWITZERLAND

The glaciers of the Alps gave Switzerland her many lakes — deep, narrow bodies of water scattered among the high mountains. Even in the loftiest ranges small tarns frequently occur.

Like the fjords of Norway, these lakes occupy deeply carved glacial troughs, but, in this case, blocked at their lower ends by moraine deposits. A moraine is a mass of rocks and soil carried along by a glacier and left behind when the glacier melts. Sometimes moraines form little hills; sometimes, when deposited at the end of a glacier, they form a horseshoe-shaped dam at the foot of the lake. This is usually broken at the middle for the passage of a river.

The Lake of Geneva, in the southwestern part of the country, is the largest of the Swiss waters. "Clear, placid Leman," Lord Byron called it in one of his poems, for Leman is the name by which the French know it. It is marvelously blue and clear, forty-five miles long and about nine wide, and above it tower snow-crowned, glorious mountains. It is fed by the river Rhone, which pours a gray icy

*Waters, Ltd.*

"Clear, placid Leman" — a view near the eastern end of the Lake of Geneva with the city of Montreux on its shore.

flood in at the east end, and flows out clear and blue at the southern end and then down into the French lowlands. (This story of Switzerland will be more interesting if you look up the places on the map on page 110.)

Not only because of its beauty is the Lake of Geneva celebrated. It is famed in legend and story, for many things have happened upon its banks. Noted men and women of many lands and times have lived and worked there. At Chillon, not far from where the Rhone enters, stands a castle built during the early Middle Ages, beneath which is a dungeon where the patriot Bonnivard was imprisoned. In the days when Switzerland was struggling to obtain its freedom, Bonnivard defended Swiss liberty against the Duke of Savoy. He was confined at Chillon for six years, and released only when the castle was captured by the Bernese, the mountaineers of the canton of Bern, who



succeeded in overcoming the forces of the tyrant. Byron's poem, "The Prisoner of Chillon," tells this story.

Many wild swans haunt the shores of the Lake of Geneva. Records say these are descended from some tame birds brought there about a hundred years ago, but the peasants declare that is not true. The swans have come from some white-winged creatures who once upon a time drew a luck boat across Geneva's bright ripples — so the legend says — an enchanted craft that was seen very often in the olden time gliding up and down the lake. Neither oars nor sails were needed to speed it over the waters, for it was drawn by singing swans and carried a fairy crew. On the prow stood a radiant silver-robed creature, her gleaming hair rippling down over the hem of her garment, veiling a golden basket in which were fruits and rare flowers. With a lavish hand she scattered these to sprites at her feet, yet the basket was never empty, for continually by enchantment it was filled.

Whenever the vessel touched the shore, the soil produced as never soil produced before or since, and if any peasant was so fortunate as to catch a glimpse of the boat, he and his children became rich beyond all want and were happy to the end of their days.

For hundreds of years the magic ship rocked up and down the lake, and because it touched the shore frequently, and countless peasants had glimpses of it, there was wonderful prosperity in old Helvetia, as Switzerland used to be called. Then a great misfortune befell the land. A steamboat was brought to Geneva and plowed, a screaming, snorting monster, across the waters. The noise terrified the gentle swans, and with wild cries they flew away, taking the craft with them. Never again did the peasants behold the silver-robed fairy and the shining sprites, or hear the music of the snowy pilots.

After a long, long time, some swans came again to the shores of the lake, and the people looked upon their coming



as a good omen. There were those among the wise folk, however, who said they were brought by a bird lover. But the herdsmen shake their heads and insist they are descendants of the ones who drew the fairy craft of olden days.

Almost due north of the Lake of Geneva is the Lake of Neuchâtel, a small but beautiful body of water, with the Jura Mountains towering beyond it. At the northeast end of the lake is the town of Neuchâtel, charmingly situated at the foot of the mountains. Its history is filled with deeds of bravery, as is that of most towns of Switzerland, which had a long and bitter struggle before gaining its freedom.

Lying east of these two lakes are many others, all justly celebrated for their beauty, most of them famed in history and legend. In the Bernese Oberland are Thun and Brienz, and northeast of these is Lucerne — Lake of the Four Forest Cantons, as the Swiss call it, because its waters wash the shores of the four states of Lucerne, Schwyz, Unterwalden, and Uri.

In the beautifully situated city of Lucerne may be seen the noble Lion of Lucerne, a colossal piece of sculpture hewn out of a solid wall of sandstone at the back of a tiny park. This is a monument to the memory of about eight hundred gallant Swiss Guards, officers and men, slain by a mob in the palace of the Tuileries in Paris during the French Revolution. Word had come to them from Louis XVI not to fire upon the people in order to protect him and his family. This left the soldiers helpless against the rabble, which swept into the building in murderous frenzy; and too faithful to desert their posts, they were cut down without mercy.

When word of the bravery of these men reached Switzerland, the people determined to erect a monument commemorating their loyalty and courage. Everybody contributed to the fund, rich and poor alike, humble peasants giving from their savings and children sending treasured coins. A Dane named Bertel Thorvaldsen, then a rising young

sculptor, was engaged to do the work. For his subject he chose a huge crouching lion pierced by a dart and dying, but still guarding with his paw the shield of France.

Rising above Lake Lucerne is the Rigi, a mountain up which a cog-wheel railway carries every summer thousands of people who wish to see the long white range of the high Alps illuminated by the sunrise or by the alpenglow, a glory of rose and amethyst that at sunset floods the peaks of Switzerland.



*Wehrli, Ltd.*

The Lion of Lucerne carved in a great sandstone rock in memory of the faithful Swiss Guards who died at Paris in defense of Louis XVI of France.

Towering above Lake Lucerne also is Pilatus, a mountain from which there is a view even more superb than that from the Rigi. This peak has been called the barometer of the Lucerne region, and the people living there have a rhyme that, translated into English, runs like this :

If Pilatus doffs his cloud hat,  
Then will the day be fine;  
But if he keeps it on,  
Rain will come, not shine.

All around Lake Lucerne are rocks and mountain passes celebrated in Schiller's *Wilhelm Tell*, one of the finest heroic dramas ever written, and based upon the story of the famous Swiss hero, William Tell. Some historians declare this patriot never lived, but just the same you will find his statue in the village of Altdorf, in the Canton Uri, standing on the exact spot from which he shot the apple from his son's head.

The Lake of Zug, delightfully clear and very deep, nearly seven hundred feet, lies about five miles from Lake Lucerne, nestled between rugged mountain walls. And some twelve miles north of Zug is Lake Zurich, long and narrow, only two and a half miles wide but twenty-five miles long. It is encircled by slopes with meadows at their base and orchards and vineyards above. In the background are majestic mountains, making the scene an inspiring, unforgettable one, although the peaks are not so near as those around Lucerne and the Lake of Geneva.

Besides all these, there are other lakes in Switzerland, so many that to tell about them all would fill a big book.

### III. THE LAKES OF NORTHERN ITALY

Since the mountains of central and southern Italy are low and in a warmer zone, they were never occupied by glaciers, as were the Alps. The few lakes in this region are of volcanic origin. In the northern part of the Italian peninsula, however, in the foothills of the Alps which form the mountains of Piedmont and Lombardy, are numerous beautiful lakes. Their beds were carved out by Alpine glaciers.

One of the largest of these is Como, winding for more than thirty miles in and out among the ridges. The praises of Como were sung by Virgil and other great writers of the past, and many people today think it the finest lake in



*Wehrli, Ltd.*  
Lake Como, winding in and out among the mountains. It is the most celebrated of the lakes of northern Italy.

Italy. It is over a thousand feet deep, and its waters are blue, like those of the Lake of Geneva. Along its banks grow luxuriant gardens and vineyards, with beautiful villas nestled among them. Above these clamber groves of chestnut and walnut, and beyond are the magnificent white peaks of the Alps.

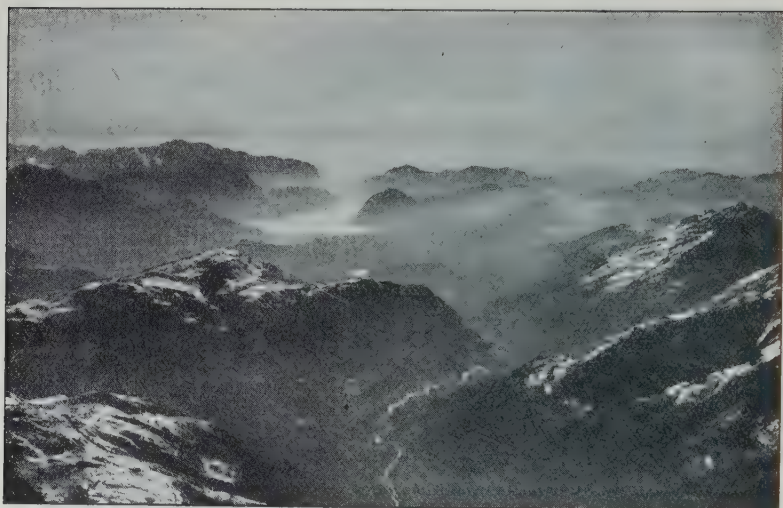
The town of Como, at the southern end of the lake, is celebrated as being the home of several famous men. Pliny, the great naturalist, was born at Como, and there too Volta, a celebrated scientist of the nineteenth century, first saw the light. He was famed for his discoveries in the field of electricity, and his name survives in the words *volt* and *voltage*.

Chiefly in Italy, though with its upper portion in Switzerland, lies Maggiore, flashing its waters among the heights for thirty-seven miles. Lake Maggiore is walled in by lofty mountains, and superb forests clothe its banks.

In the upper part of Maggiore, lying in the Swiss canton of Ticino, the water is green, but in the lower part, which slopes down into the plains of Lombardy, it is blue like the lakes of Como and Geneva. Villas set amid flowering shrubs and vines dot its banks, and there are groves of olives, figs, and pomegranates, for in the balmy climate of Lombardy semi-tropical fruits thrive, so that the lower shores of Maggiore suggest an enchanting garden.

East of Como and Maggiore, and vying with them in beauty, is Lake Garda, extending down into the warm part of Italy, its shores cloaked with lemon trees. Garda is the bluest of all lakes in the world, a blue so rich and deep that it has been the theme of poets ever since the days of the Romans. The Roman poet Catullus was very fond of Lake Garda. He had a country house on its left bank, the ruins of which are still to be seen. Alfred Tennyson went frequently to this lake and celebrated its charms in one of the most musical of his poems.



*Ad Astra Aero*

Mountain ridges on the border between Switzerland and Italy as seen from an airplane. In the valley lies the Lake of Lugano.

There are numerous other lakes in northern Italy. They are smaller than Como, Garda, and Maggiore. Their origin is the same, however, for they were made by ice streams scooping out their beds and damming up the channels with walls of moraine.

#### IV. THE LOCHS OF SCOTLAND AND THE GREAT GLEN

Wherever the glaciers went, we find lakes occupying valleys formed by the moving ice streams. In Scotland are some noted and beautiful ones, the largest among them being Loch Lomond. Wooded shores encircle Loch Lomond, and wooded islands dot its surface. Above it towers Ben Lomond, which is not very much of a mountain, in comparison with the higher ranges of Europe, but in this region where there are no really high peaks, it seems quite stately when viewed from a valley.

In the ancient days, the Scottish clans met on the banks of Loch Lomond to solve their problems, and as they did not always solve them peaceably, the shores of this body of water frequently echoed to the clash of arms.

About six miles east of the northern end of Loch Lomond is the most celebrated of all the lakes of Scotland, Loch Katrine, made famous by the pen of Sir Walter Scott. In its center is a wooded islet known as Ellen's Isle, where lived Ellen Douglas, heroine of *The Lady of the Lake*. The tiny white beach where the water still ripples is the "silver strand" of which Sir Walter sings, the place where Roderick Dhu and his clansmen landed, singing as they swept shoreward,

Hail to the chief who in triumph advances!  
Honored and blest be the evergreen pine!



*Valentine & Sons, Ltd.*

Loch Katrine, one of the most beautiful of the glacier-made lakes of Scotland. In the foreground is Ellen's Isle, made famous by Sir Walter Scott's *The Lady of the Lake*.

Thus by the magic of Scott the bloody deeds of these fierce struggles have been covered with the gloss of poetry, which hides from us the cruel hate behind such medieval feuds.

The woods cloaking the shores of this lake are the ones through which James Fitz-James, the Knight of Snowdon, who was in fact Scotland's king, chased the stag. The entire region is rich in memories of picturesque chiefs and contending clans, and it is as rich in beauty as in historic and poetic associations.

There are other clear, deep lakes in Scotland, besides countless tarns, every one of them formed during the great winter of the remote past, each beautiful in its own way and abounding in history and legend.

Extending across Scotland from the Firth of Lorne in the south to Moray Firth in the north, dividing the land into two parts, is what on the map appears to be a river or ocean arm. It is a long, narrow valley in which lie a succession of lakes separated by small land masses, and is known as the Great Glen. In a geological way it is one of the most remarkable features of Great Britain.

The Great Glen was once the bed of an ancient river. During the ice ages, as glaciers moved down this river bed they deepened it, and here and there deposited walls of moraine that dammed up the bed and made a series of lakes. There are four of these lakes, graceful, finger-shaped bodies of water set between wooded hills.

About a hundred years ago the British government realized that by just a little work the Great Glen could be turned into a waterway connecting northern and southern Scotland. The Caledonian Canal was dug between the lakes, and now steamers go all the way from the Atlantic through the Firth of Lorne to Moray Firth and the North Sea.

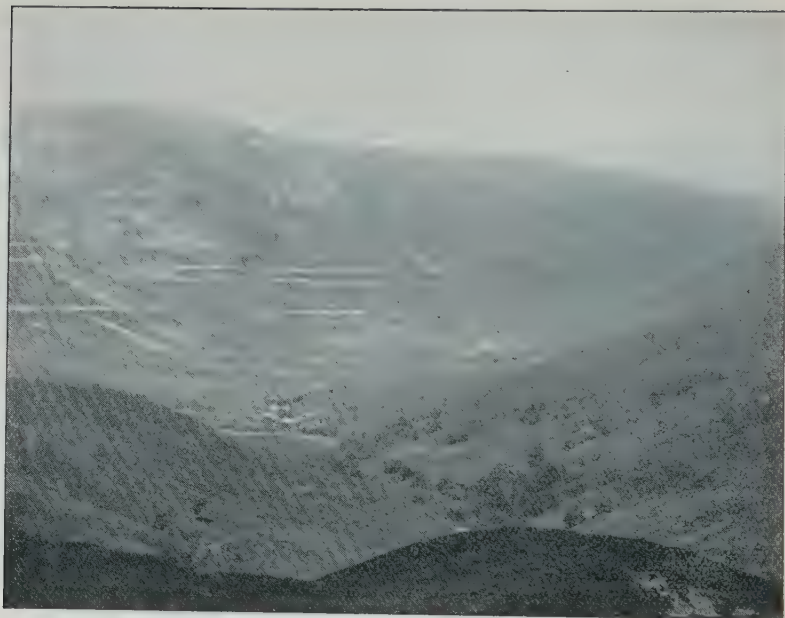
*Wehrli, Ltd.*

A lake made by ice that blocks the outlet of its waters — Märjelen See, in a small valley near a mountain crest in the Bernese Oberland. The lower end of this valley is walled in by the Great Aletsch Glacier. From time to time, the waters of the lake find an outlet under the ice and pour down the mountain side, flooding the valley below.

## V. THE MÄRJELLEN SEE AND THE PARALLEL ROADS OF GLEN ROY

Among the mountains of the Bernese Oberland of Switzerland is a mass of glacial ice blocking up the valley of a little stream called the Seebach. Behind this ice is a clear little lake known as the Märjelen See, which is held in place by the mass of ice moving down across its outlet from some higher elevation. Märjelen looks like many other lakes of Switzerland that lie high up among the snow fields; but it is different from them and from all the rest in Europe, because from time to time, with the variations in the moving ice, the lake behind it is altered too. Occasionally, through some break in the ice barrier or through a passage tunneled



*Valentine & Sons, Ltd.*

The valley of Glen Roy in Scotland, where the Parallel Roads (white lines on the distant hillside) mark the shores of an ancient lake. Just as at Märjelen See in Switzerland today, this old lake bed was blocked up by a glacier across the end of the valley. After a while some of the water drained away so that the lake was lowered to a new shore line, and still later it reached a third level or terrace. When the glacier finally disappeared and the valley was no longer blocked up, it became dry land.

underneath the ice, the waters are released, flooding the valley below. Then the stream flows unchecked down the valley, and it may be several years before it is blocked by ice and the lake fills up again.

This shifting of the ice barrier that makes the Märjelen See has been going on for a very long time. In some of the churches are old records which show that in the fifteenth and sixteenth centuries the people tried to find a way to prevent the sudden draining of the lake which caused calamity to the villages that lay below.

Apparently the same thing that happens at Märjelen See



occurred ages ago in the western part of the Scottish Highlands, where a deep valley called Glen Roy opens toward the sea. Along the slopes of the upper part of Glen Roy appears a series of old levels, or terraces, shaped like irregular parallel half circles, one below another.

These terraces are known as the Parallel Roads of Glen Roy. Agassiz showed that these are the relics of ancient shores marking the different levels of a shifting lake, shut in each time by masses of ice that blocked off the valley.

The valley at Glen Roy is wide open now, for the ice that blocked it up and made the lake has long since passed away. If the Märjelen See were to be drained, we might find the valley of the Seebach marked by levels like the Parallel Roads of Glen Roy.

Each lake with a definite and permanent shore line in time builds up a beach, which is everywhere at the same elevation. If the lake should be drained, this beach would remain as a sort of road or terrace. Examples in America are the Ridge Road near Lake Ontario, and the high terrace shelves above Great Salt Lake that mark the ancient boundaries of Lake Bonneville.

## VI. THE LAKES OF ENGLAND AND IRELAND

In the counties of Cumberland and Westmoreland, in the northwest of England, lies the beautiful Lake District. This is a region of ancient mountains worn down by glaciers into rounded hills, and the various sheets of water — sixteen in all — are tucked among glens and knolls.

Lake Windermere, or Winding Lake, with wooded banks and rolling hills all around it, is the largest of the English lakes. Beside it, a hundred years ago, lived and wrote the famous "Lake Poets," Wordsworth, Coleridge, and Southey, and in many of their poems we find references to the region.

About five miles west of Windermere is Lake Coniston, sometimes called a miniature Windermere, because it is shaped much like it. Tennyson came often to Coniston for rest and quiet, and Ruskin had a home there.

Overlooking Lake Coniston is a low mountain called Coniston Old Man, celebrated because of its fine view. From its summit scattered lakes and cliffs can be seen, with stretches of grove between, making a panorama so delightful that it is worth going far to see.

Derwent Water, north of Windermere, is often thought the loveliest of English lakes, because of its shape and the beauty of the cliffs, woods, and hills that surround it. Like all the others, its valley was carved out by vanished glaciers. The ice deepened and widened the channels of ancient streams, casting across them at intervals its moraine dams.



*Aerofilms, Ltd.*

Airplane view showing a portion of Windermere, or Winding Lake, in the heart of the Lake District of England.

*Ewing Galloway*

Middle Lake, one of the Lakes of Killarney, Ireland, formed by the damming up of an old river valley by glacial material.

Glacial lakes are scattered throughout Ireland, some large, some small, some of them celebrated throughout the world because for many years their loveliness has been the theme of poets. The most widely famed are the Lakes of Killarney, three in number, which lie in a basin at the foot of a range of low mountains. They are dotted with wooded islands, and since they are connected by a stream it is possible to go by boat from one to the other.

The Lakes of Killarney figure in many of the songs of the Irish people, and around them cluster various legends. One of these old tales says that the region once belonged to a man who was friendly with the fairies, and that then there were no lakes. There was only a well that had been charmed by the supernatural folk, and so had power to heal every malady, and to give perpetual youth and beauty to whoever drank of it.

The queen of the fairies had commanded that the owner must cover the magical well each night, and for a long time he was faithful in performing the duty. But once during a storm, when he could not bear the thought of going out, he decided to trust to luck. In the morning his house no longer stood in the valley. It was far on a hillside beyond, and down where his meadow land had been there were three sheets of water. The fairy well had expanded into the Lakes of Killarney, and to this day some of the peasants declare the waters hold magical qualities, as the well of old was supposed to do.

The largest of the Irish lakes, Lough Neagh, is near Belfast in the northeastern part of the island. The basin in which this lake lies is said to have been formed by the sinking of an inland plateau, at the same time that the coast lands of Ireland, Scotland, and Norway sank.

Every Irish lake has its legend. The one of Lough Neagh is about a giant who was so greedy for treasure that he robbed every peasant who had managed to store up a little gold. But once when he did it, the victim asked the fairies to help him recover his savings. Because he had always been a worthy chap, the little people befriended him, and although they could not regain the gold pieces for him, they could save him from further loss. At dawn next day the house of the giant had disappeared. A lake covered the place where it had stood, and the thieving fellow was never seen again.

Numerous other lakes give charm to the Irish landscape. All of them are of glacial origin, formed by the moving ice in the times when Europe north of Italy was a great Arctic region.

## VII. THE SCANDINAVIAN LAKES

Wherever fjords indent a shore, the back country is full of lakes. Beyond the fjords of Scandinavia, lakes abound in



*Swedish State Railways*

The shore of Lake Vättern in southern Sweden. The lake is 80 miles long and 18 miles across at its greatest breadth.

such numbers, especially in Södermanland, Sweden, that it has been said that here "the Lord forgot to separate the land from the water."

The lakes of Sweden are larger than those of Norway, two of them, Venern and Vättern, being among the largest in Europe, and all are mainly the result of the work of ancient glaciers. Lake Venern is connected by the Göta River with the Kattegat, the channel separating Sweden from Denmark. A canal connects Lake Venern with Vättern, and another canal unites Vättern with the Baltic Sea, so that products can go by water entirely across southern Sweden. In fact, the canal system of Sweden is one of the finest in the world and has had much to do with the commercial development of that land.

The term, Göta Canal, has come to be applied to the whole system of canals, rivers, and lakes which form a navigable passage across Sweden from the Kattegat to the Baltic.



And a very intricate system it is, because several streams are pierced by the canals, and this enlarges the great system of waterways and makes it a complicated network of transportation lines. By going up and down and in and out among the lakes and canals of Sweden, one can travel two hundred and forty miles by water without changing steamers, through a region of great natural beauty and rich in historic memories.

Sweden is a very old land. Tradition says it has been inhabited continuously for four thousand years. History tells us that it has existed as a state for twelve hundred years, and during that long stretch of time a great deal has happened there. All along the steamer route are to be seen ruins of castles that were once the seats of mighty lords. Thriving towns and cities, in which are many fine modern buildings, are to be seen also, for this far northern country has kept pace with the march of progress, and prides herself on her development of today as much as she does on her glory in the past.

The lakes of Norway are small, being confined in narrow ravines; many of them are extremely deep and have high, craggy banks. One has to do some mountaineering to visit them, but the magnificent scenery repays all exertion. Before the automobile came into use, travelers went over good roads in the two-wheeled carts called *stolkjaerre*. Every seven miles there was a farmhouse, where one could get meals, usually lodging, and always a change of horses. The little mountain ponies of Norway are very docile, and the *stolkjaerre* is small and light, with a seat for two. Behind the seat perched the *skydsgut*, or express boy, who allowed you to do the driving. Sometimes he was replaced by the *skydsgente*, or express girl, who was equally competent. No part of the world is more delightful to visit in the months of July and August than Norway, where "the air of summer is sweeter than wine." The only unpleasant feature is the

frequent rain; but in the summer time it is never dark in Norway, for the twilight lasts all night, and a traveler doesn't mind so trifling an obstacle as rain. In winter, however, it is very different, the roads being dark, dismal, wet, and snowbound.

In summer the people drive their cattle into the high mountain regions, and there, where some of the loveliest lakes lie, one finds the richest of cream. In the far north they make what they call *rödgröd* — red grits. This is barley flour stewed with blueberries and covered with cream. There is nothing else in the way of cereal luxuries quite so good to the wanderer in the mountains. Besides, it is often accompanied by a dish of trout, which swarm in all the lakes and brooks.

In Norway, as well as in Sweden, one sees everywhere evidences of the olden time, as well as signs of present-day progress. The *stolkjaerre*, in which for centuries people traveled in the high mountains, is rapidly giving way to the automobile. Factories with modern machinery are taking the place of the hand weaving and other industrial work that once was done entirely in the peasant homes. Highways, railroads, electric lines, and canals uniting several of the rivers, afford good transportation facilities almost throughout the entire country.

## VIII. THE LAKES OF CENTRAL AND EASTERN EUROPE

When summer comes to Germany and Austria, the young folks from the towns set out with staff and knapsack for some of the mountain lakes. Indeed, lakes of all sizes and shades of green are scattered over the upland region, though not so plentifully as in Sweden and Norway.

The Lake of Constance, which lies on the border of three countries — Switzerland, Germany, and Austria — is the largest lake of the German lands. This fine sheet of water

is forty miles long and eight miles wide, and on its banks are many towns and villages. Vineyards grow close around it, for grapes do well in the mild climate of this low mountain country, and the wine of Constance is famous. And beyond the vineyards rise the snowy crests of the Alps.

The Rhine comes down from the Alps of eastern Switzerland and flows through the Lake of Constance, just as the Rhone flows into the Lake of Geneva at one end and out at the other. Several beautiful islands, some of them finely wooded, rise above its waters. On two of these islands there are villages, and above the villages are castles that stand in beautifully terraced groves.

Other lakes dot the German, Austrian, and Hungarian mountains, far too many for us to name. In Germany and Austria alone there are over three hundred, most of them molded by glaciers that once filled many of the valleys of this region.

The largest lake of Hungary is Lake Balaton or Platten, almost as large as Constance, a favorite retreat of fishermen from all over central Europe, and a noted pleasure resort. Lake Balaton lies in the heart of the great Hungarian plains, but along the north bank there are jagged hills, which make the scenery very pleasing, especially when viewed from the opposite shore.

Russia also has some noted lakes. They lie chiefly in the northwest, and two of them, Ladoga and Onega, are the largest in Europe. Because of their size, they should be of great commercial importance, especially as they are connected by canals, and another canal unites Onega with the White Sea. But this part of Europe is very cold, far colder than Norway, where the Gulf Stream moderates the climate. Consequently Ladoga and Onega are frozen about half the year and are of little benefit to commerce.

As we go south and east through Europe, we find scattered lakes in Jugo-Slavia, Albania, Rumania, and Greece.



*Ewing Galloway*

Peat bed in Killarney, Ireland, from which is taken the peat that is used as fuel.

Peat is the result of the accumulation of plant remains for many centuries.

One of the finest of these is the Lake of Scutari, between Montenegro and Albania, a body of water about twenty-five miles long, which fills a broad basin, bordered by barren mountains. (On the large map following page xii you will be able to see the location of the countries mentioned.)

## IX. THE PEAT BOGS OF EUROPE

There are several thousand lakes in Europe today, but these are not nearly all the lakes and ponds the glaciers made when they moved down from the north during the great ice ages. Hundreds of small lakes and ponds have become marshes or bogs. This is especially true in the north of Europe, in Scotland, Ireland, Scandinavia, and Russia.

The transformation of lakes into bogs is started by a tall rootless moss called sphagnum, which grows upright in the

water, close-packed and about a foot in height. As the stem of each plant grows higher and higher, an equal part at the base dies and drops to the bottom. Cranberry and other delicate vines soon bind the mass together so that it forms a floating carpet on the surface of the water, known as a quaking bog. The vines hold the surface moss in place. Little by little the droppings of the sphagnum fill up the pond and, after the lapse of centuries, form an imperfect coal known as peat. Trunks of fallen trees are often more or less embedded in the peat, but the bulk of it comes from the dropping stems and leaves of sphagnum.

In districts where the peat serves for fuel, it is cut out in blocks and dried. It is used in Ireland, Russia, Scotland, and Scandinavia, but nowhere else in the world does it figure so largely in the life of the people as in Ireland.



## CHAPTER THREE

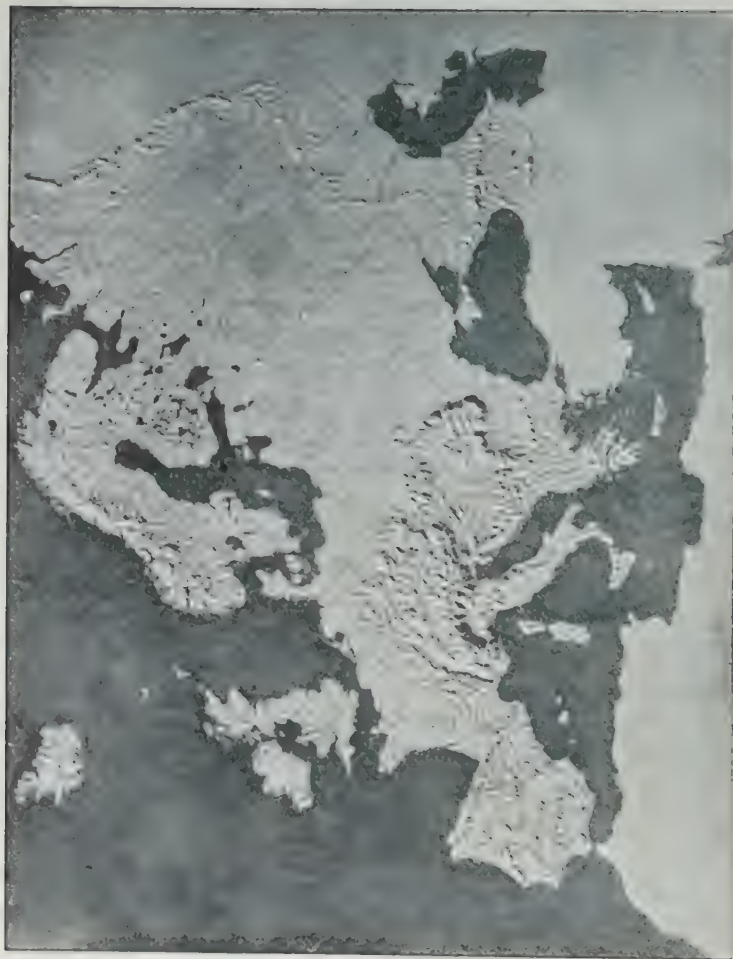
### VOLCANIC ACTION IN EUROPE

#### I. THE VOLCANOES OF EUROPE

EUROPE, like North America, did not rise from the ocean an unbroken stretch of land. As the earth's crust contracted in cooling and mountains were folded along its surface, scattered islands that were the summits of mountain chains appeared above the waters one after another. The first and oldest of these were in the north, comprising what are now the uplands of Great Britain and the mountains of Norway. Because the rains, frosts, and rivers have been at work upon them so long, they are now worn down low, but in the beginning the ranges of Great Britain were much higher than they are today, and those of Norway were very lofty, some of them perhaps as high as the Alps.

Then, as centuries passed, emerged the various other ranges that we know, appearing above the water as groups of islands separated by wide stretches of sea. The Pyrenees, the Carpathians, the Urals, the Auvergne Mountains of France, the chains of the Balkans and Greece rose out of the waves, later the Alps, and last of all the Apennines. And little by little deposits carried down from these mountains by the rains and rivers were piled back along the shore by the sea, forming the low country and making the continent as it is today.

For centuries after the rise of the great heights of Europe, ages afterward perhaps, among some of them there were volcanic eruptions with streams of lava flowing out of the earth and hardening upon its surface, and the various other disturbances that occur in the process of mountain making. The volcanoes are for the most part in the extreme southern section of the Apennines at the lower end of Italy, on the adjacent island of Sicily, and in the Lipari Islands, west



Model of the continent of Europe, showing the land and water areas. Notice the mountain regions and the drainage system of the great level plains extending from the Carpathian Mountains to the Urals on the eastern border of Russia.

of the toe of "the boot of Italy." Scattered through Europe in other sections are still other volcanic peaks, but nowhere else are they so numerous as in the region of the Mediterranean.

Most of the volcanoes of Europe have long been extinct, but there are still some active ones, the most celebrated being Vesuvius, which lies nine miles southeast of Naples. For many centuries Vesuvius was believed to be extinct, and during old Roman times its crater was often the hiding place of runaway slaves and brigands. Then in the year 79 A.D. a great eruption occurred there, and the cities of Pompeii and Herculaneum, near its foot, were buried in a mass of crumbled red-hot pumice stone — really lava full of fine bubbles or air cells — usually spoken of as volcanic ashes. Following the ashes came a flow of molten lava, which still further covered the land and then hardened, forming a thick crust above the buried towns.

Pompeii and Herculaneum were forgotten. A town called Portici grew up over Herculaneum, while above Pompeii there was just a gray and desolate plain.

In 1709 a man who was digging a well at Portici worked down into some ruins that proved to be an old theater. For almost a hundred years afterward, other evidences of a buried city were brought to light from time to time, and in 1806 the government of Naples began excavating. As the work progressed, there were uncovered a temple, palaces, statues, and houses that had been the homes of the common people. Intermittently, from that time forth, the excavating at Herculaneum was carried on, until a considerable portion of the town was laid bare.

On the plain that covered Pompeii, in 1748 a group of peasants who were digging came upon a ruined house in which were some ancient works of art. Excited over the discovery, people in that region began excavating in the hope of finding treasure, and as they worked discovered

that a town lay beneath. For almost sixty years, however, no systematic attempt was made to find out about the place. Then when excavating began at Herculaneum under the direction of the Neapolitan government, work was commenced at Pompeii also, and many ancient buildings were uncovered.

Pompeii is now entirely exposed, but at Herculaneum the excavating has not progressed so rapidly, for in order to get at the ancient town it has been necessary to destroy the modern one of Portici. But if you go to either one of the buried cities, you can step back almost two thousand years. You can have a glimpse of the life of the Romans, as they lived during the time of Christ, for although the wooden parts of the buildings were for the most part burned by the lava that covered them, the plaster and stone, with the frescoes upon them, remain. So Pompeii and Herculaneum show well how they looked before the eruption. You can see the bedrooms in which their inhabitants slept, the temples where they worshiped, the gardens through which they strolled with their friends, and the pictures and statues that adorned their homes. Even the kitchens are there to view, just as they were when the cooks deserted them on the tragic day.

During the destruction of Pompeii and Herculaneum, a great many people lost their lives, some of them meeting death in the houses, others being covered with hot ashes as they rushed to the seashore in the hope of escaping by boat. Among those who perished at Pompeii was the great Roman naturalist, Pliny, who died trying to find out about the causes of the fearful outbreak.

Since the time when Pompeii and Herculaneum were buried under ashes and lava, there have been other eruptions at Vesuvius. The town of Torre del Greco, toward the base of the mountain, has several times had floods of molten rock sweep down its streets, after which the stone





*Donald McLeish*

A street in the ancient city of Pompeii, which was destroyed in a few hours and lay buried for nearly 1700 years under volcanic ash from Vesuvius.

houses and the village church had to be built up higher to match the new level. Vesuvius is still active in a greater or less degree, though a number of years have gone since there has been a destructive outbreak there.

The Lipari Islands, about a hundred and fifty miles south of Naples, are all of volcanic origin, one of them, Vulcanello,



having risen from the sea during an eruption in the year 200 B.C. But the others are older.

As far back as we have any record of the Lipari Islands, we read of volcanic disturbances there. The heat forces deep within the earth are still at work in this part of Europe, for there are active volcanoes upon these islands even now. On Vulcano is a mountain with a great crater, and not far from it, near the shore, is a boiling hot sulphur spring. The one industry of this island is the gathering of sulphur.

Twenty-two miles northeast of the Lipari group is the lone island of Stromboli, mostly consisting of the tall cone of the volcano. Almost constantly this peak sends out smoke and sulphurous gases, and sometimes pumice. For a great many years the overflow of molten rock from Stromboli spilled out only from the vertical west side of the crater, and a little fishing village occupied the east side of the mountain base. But in 1913 an eruption destroyed this village, and although the partly sheltered town is now rebuilt, nowhere on the island can people be certain they will not some day be driven from their homes or perhaps buried in hot ashes.

The ancients believed Stromboli was the seat of Æolus, god of the winds, and declared that from it he sent out all the breezes that blow over the world. Perhaps they had this idea because smoke often poured from the crater, and this smoke may have seemed to them the beginning of the winds. At any rate, they were certain the god abode on the island, and in the *Iliad* Ulysses, who wandered over many lands on his return from the Trojan War, is pictured as visiting Æolus at his Cave of the Winds.

Even during the Middle Ages weird stories of Stromboli went over the world. People of those times thought that the deep crater on the tall peak opened into the infernal regions, and returning crusaders who passed that way claimed



Lava masses below Vesuvius. The lava came from the crater as hot molten material and hardened in fantastic shapes as it cooled while pouring down the sides of the mountain.

to have heard the cries of tortured souls in purgatory. These tales originated through the travelers' fear at seeing smoke issue from the opening, for most of them knew little of volcanoes.

The great volcano of Etna, on the island of Sicily, is almost as celebrated as Vesuvius. Its eruptions have often destroyed villages, but on the whole it has been less destructive to the region around it than Vesuvius has been.

Etna is one of the tallest of all active volcanoes, reaching a height of nearly eleven thousand feet. But it is not very steep. Vesuvius, only half as high, has much steeper slopes. To the geologist, the difference in the shape of these mountains shows that they throw out different material, those erupting lava being less steep than the ones that send out



*Ernst Guthe*

Vesuvius, rising against the sky beyond the city and bay of Naples. The clouds of smoke-like ashes issuing from the crater indicate the heat within. The high peak of Vesuvius has been built up by the outpourings of lava and ashes during thousands of years.

ashes. Vesuvius, pouring out ashes for the most part, rises at a considerable angle, while Etna, erupting chiefly lava, is not steep.

## II. LAKE AVERNUS AND THE ROMAN CAMPAGNA

Many of the lakes of the world have been dug out and shaped by glaciers, but sometimes it happens that craters of ancient volcanoes fill with water and become lakes. Occasionally, instead of being high up among the mountains, these crater lakes are in the lowlands.

A very noted one is at Pozzuoli in Italy, not far from the base of Vesuvius, and near the ruins of the temple of Serapis. It is about two miles long and very deep, and is named Avernus. Today it is a pleasant, cheerful spot bordered with groves of chestnut and orange trees, and fringed with vineyards, a favorite vacation place of the people of Naples. In the days of the old Romans, however, and for several centuries afterward, it was known as the birdless lake. It sent out sulphurous vapors that killed all birds attempting to cross it, and were almost as deadly to human beings. But the volcanic heat that caused these vapors passed away. Mists no longer issue from its waters, and birds fly over them in safety.

Because of the sulphurous vapors, the origin of which they did not know, the Romans of old believed Lake Avernus was an entrance into Hades, as they called the realm where the dead were supposed to dwell, and dreaded to go near it.

There are several lakes in Italy filling depressions that were craters of ancient volcanoes. One of them, Lake Lucrine, lies near Lake Avernus, and so close to the sea that only a narrow strip of land separates it from the waves. On one side of this lake is an ancient embankment now under water. This is called *Via Hercules*, or *Road of Hercules*, and according to mythology it was the path over



which he drove to pasture the red oxen of Geryon. Hercules was the son of Jupiter, king of gods and men, who wanted his son to be ruler of a great realm. In order to prove his strength and courage, he had to perform twelve tasks. These were known as the Labors of Hercules. One of them was driving the oxen of Geryon.

The Roman Campagna is a broad plain in central Italy stretching for miles about Rome. Once it was a volcanic



*Ewing Galloway*

The broad level stretch of the Campagna lying east of Rome, with the Sabine Hills in the distance.

district, and it is now marked with ancient craters, around which are scattered swamps occupied by frogs and infested with mosquitoes.

Very few people live on the Campagna now, yet there was a time when it was one of the most densely populated sections of Italy. Upon it life was pleasant and fairly healthful. The land was held by many small owners, sturdy, industrious men who had conquered the swamps. But during the warfare that cursed imperial Rome, the farmers were killed off. Powerful landlords took possession of these



and other farm districts, bringing tribes of Moors from Africa to work their estates.

Men driven by the overseer do not work with such interest and joy as the independent landholder. Because the toilers on the Campagna did not put their best effort into their work, the yield from the soil became each year less abundant. Swamp grass came in. Mosquitoes took possession of the region and drove out most of the population.

In themselves swamps are not dangerous, but because of the mosquitoes that breed in them, they may become a source of peril. It is only certain species of mosquitoes that carry harmful germs. These germs are borne from the sick to the well, and thus certain dangerous diseases are spread. The Campagna is not the only region that has been made almost a deserted place by mosquitoes. It is said that Sparta, the ancient rival of Athens, lost a considerable part of her population from this cause. Malaria spread by mosquitoes also had much to do with driving people out of parts of Macedonia and Turkey.

In the Campagna about six miles from Rome is a small lake of hot mineral water, called Lake Zolforeo. This is saturated with borax, a white mineral substance much used as an antiseptic, or purifying agent. A factory has grown up on its banks, where the water is evaporated and the boracic acid obtained for commerce.

### III. THE VOLCANIC REGION OF GREECE

One of the Cyclades Islands, southeast of Greece, is Santorini, or Thira, as it is called today, an island that is the summit of a volcano. During ancient times the island of Santorini was thickly inhabited and covered with vineyards. But about 1500 B.C. a terrific eruption of volcanic ashes and lava took place there, wiping out the peasant community as completely as Vesuvius destroyed

Pompeii and Herculaneum. At the same time the land was repeatedly shaken by an earthquake, and the sea broke over the shore in great waves.

As years passed, other towns and villages grew up on the island. Then in 196 B.C. the volcano gave signs of life again. Since that time eruption after eruption has occurred, although none has been so destructive as the first recorded over three thousand years ago.

To the northwest of Santorini lies the island of Melos or Milo, also an ancient volcano. It broke out with great destruction centuries ago. In the year 1820 as some workmen were making an excavation for the foundation of a building, they came upon a piece of sculpture that, in the days before the destruction of the ancient settlement, had adorned a temple or perhaps the home of some noble. It was an exquisitely formed statue of Venus, goddess of beauty. Its arms had been broken off, presumably in the crash of an earthquake. But in other respects it was as perfect as on the day the sculptor finished it. This statue now stands in the great art gallery of the Louvre in Paris. Because it was found at Melos, it is called the Venus de Milo, and it is one of the priceless art treasures of the world.

The sea has torn away a side of the old crater of Melos, and today the bay thus formed is one of the best harbors of the Mediterranean. Hot springs are numerous upon the island, and sometimes sulphurous vapors arise, which goes to show that the heat within the earth has not yet died out.

#### IV. THE AUVERGNE COUNTRY OF FRANCE

In the center of France, in the mountains of Auvergne, is one of the most interesting volcanic regions in the world. During ages past there were many outbreaks there. Numerous little craters are still to be seen, but the country shows no traces anywhere of present heat, except in the

case of hot mineral springs, some of which have become noted health resorts.

The most widely famed of the mineral springs of Auvergne are at Vichy, a pretty town on the bank of the river Allier, to which nearly a hundred thousand people come each year to drink the mildly alkaline waters.

The Vichy springs are typical of hundreds of mineral springs in Europe, some hot, some alkaline, some charged with carbonic acid, some with sulphur or other mineral substances. They are found in the mountain regions, but especially in the volcanic districts. There are mineral springs in almost every country of Europe, and those of Carlsbad, Bath, Wiesbaden, Ischl, and many others are widely known.

The volcanoes of Auvergne are low, rounded cones, and although they were extinct before the dawn of history, the craters in general are still easily recognizable. In one chain alone there are over sixty.

Among the mountains of Auvergne are occasional sheets of hard gray rock known as basalt, like the Devil's Postpile in California. During the far-off ages streams of lava flowed out of the earth, evenly and smoothly, and as they hardened, they formed regular, vertical, six-sided columns. One of these outflows is very handsome, and bears the poetic name of Repos de l'Aigle — the place where the eagle sleeps.

On one of the volcanic mountains of Auvergne we may still see the effects of a succession of outflows from ancient craters, fine crushed cinders or ashes alternating with hard lava, one layer above the other. People of long ago dug out the ashes from under the lava layers and lived in the cavities thus formed. There is an entire village of this sort of habitation, sixty-four homes in all, each connected with the others by winding stairs, as they lie at different levels up and down the mountain. This catacomb village is known

*Ewing Galloway*

Dwelling places of today in the cliffs near Tours, France. Prehistoric people in this country dug out living quarters in the volcanic rocks, but were much less comfortable than the old couple shown in the photograph.

as Grottes de Jonas — Grottos of Jonas — because the mountain into which the homes were dug is called Jonas. Nobody lives in the cavities between the lava layers now, and ages have passed since they were inhabited. They are among the prehistoric dwellings of France.

## V. THE VOLCANIC REGION OF GERMANY

Switzerland has no volcanic territory, but just west of Lake Constance, in the southwestern part of Germany, is a series of low peaks that are extinct volcanoes. This region, known as the Hegau, is a peculiar volcanic feature of the rugged plateau called the Swabian Alps.

None of the peaks of the Hegau reaches an elevation of three thousand feet, although there was a time when they were considerably higher. But all of them have played an important part in the history of central Europe. The Huns under Attila crossed this region nearly fifteen hundred years ago, devastating the country through which they traveled. In later centuries too there was warfare here, and on the cliffs and crags of the Hegau are to be seen castles that were wrecked by contending forces and have never been restored.

About two hundred miles northwest of the Hegau, along the middle course of the Rhine, there is another volcanic section in which the forces that were once at work have long been dead. This is the famous castle and vineyard region, the part of the river where ruined strongholds more than a thousand years old lift their towers above the valley.

Here, not far from the city of Bonn, is a ridge of rounded peaks, some of which are covered with forests. The name of this group is the Siebengebirge, or Seven Mountains, and the entire ridge is of volcanic origin. Drachenfels — Dragon Rock — is the best known and most conspicuous peak of the group. Upon its summit stand the ruins of a castle destroyed early in the seventeenth century during the Thirty Years' War. Below the castle, near the base of the mountain is a cave, in which, tradition says, a dragon made its home, a monster that for generations was the terror of the Rhine Valley.

One man after another tried to rid the country of the



dragon, only to lose his life in the attempt. Then came Siegfried, a hero of the Netherlands, who strode into the cave and killed the terrible creature. Then he bathed in its blood, which made him invulnerable to all weapons. An ancient ballad speaks thus of his feat :

Yet more I know of Siegfried that well your ear might hold.  
 A poison-spitting dragon he slew with courage bold,  
 And in the blood then bathed him: thus turned to horn  
     his skin;  
 And now no weapons burn him, as often proved has been.

The story of Siegfried is one of the noted tales of northern Europe, and upon it is based Richard Wagner's opera, "Siegfried." It is because of this Siegfried legend that the mountain came to be known as Drachenfels, or Dragon Rock. The wine made from grapes grown in this vicinity is called Drachensblut — Dragon's Blood.

In *Childe Harold's Pilgrimage* Lord Byron describes the Drachenfels region :

The castled crag of Drachenfels  
 Frowns o'er the wide and winding Rhine,  
 Whose breast of waters broadly swells  
 Between the banks which bear the vine,  
 And hills all rich with blossomed trees,  
 And fields which promise corn and wine,  
 And scattered cities crowning these,  
 Whose far white walls along them shine.

On the volcanic hills around Drachenfels are numerous other ruined castles, the homes of robber knights of medieval times, who used to take toll of every boat going up and down the river, and who waylaid travelers coming through the valley on foot or horse. A bad lot, on the whole, these Rhine barons were, although they hired musicians to make songs about them in which they were credited with possessing all manly virtues.

Near the town of St. Goar, on the east side of the Rhine, is a lava crag called Loreleifels, or Rock of the Lorelei. Here, tradition says, a mermaid-like creature used to sit and comb her golden hair, and as she did so she sent many a sailor to his death. According to the old legend, the Lorelei was so lovely that the sight of her caused the men to forget their boats, which went to destruction in the rapids at the foot of the precipice. A great deal of poetry has been written around the Rock of the Lorelei. A ballad by Heinrich Heine is the most noted of these many bits of verse which tell of the beautiful river maiden and the fate of her admirers.

Another legend says that under the Rock of the Lorelei was hidden the treasure of the Nibelungs, the Rhinegold, as it is often called. This was said to be a vast store of gold and jewels belonging to some dwarfs called Nibelungs, who were all-powerful along this part of the Rhine. When Siegfried came to Drachenfels and killed the dragon, the Nibelungs became his followers. They accompanied him on many adventures and were his faithful subjects as long as he lived.

The Rock of the Lorelei is more impressive in verse than in fact, and "the wide and winding Rhine" is rather narrow at Drachenfels. But being the greatest stream in this part of the country, it appealed to the fancy of poets, who wrote some romantic and beautiful songs concerning it.

Across the river from Drachenfels is the ancient, low mountain of Rodderberg, another extinct volcano. The crater is broad and shallow, not over a hundred feet deep, and its interior is cultivated now as a grain field.

Near Rodderberg, on a volcanic rock overhanging the Rhine, is the castle of Rolandseck, said to have been built by the French knight Roland. He was a gallant cavalier of the days of Charlemagne, and the legend of Rolandseck declares that as he roamed over the world in search of

adventure, he came to Castle Drachenfels, then the home of Baron Heribert, lord of the Seven Mountains. There he met Hildegunde, daughter of the baron, and won her promise to become his bride. Just after that he was called away to war in a distant country.

Hildegunde awaited his return, but many months passed, and there was no word of the absent cavalier. Then one day a stranger wandering that way reported that Roland had been killed in battle. Straightway Hildegunde entered a convent and became a nun.

Some six months later a knight came galloping down the Rhine Valley. It was Roland, for the tale of his death was false. But Hildegunde did not meet him. She had taken a vow to devote her life to the church and could not break it. Heartbroken, the knight built the castle of Rolandseck and lived there in the hope of catching a glimpse of his beloved sometimes as she went from the convent to the little chapel where the nuns met to worship.

Another legend tells of the death of Roland in the battle of Roncevalles, in the Pyrenees, when the hosts of Charlemagne rode south to war against the Moors.

## VI. FINGAL'S CAVE AND THE GIANT'S CAUSEWAY

Not only on the continent of Europe but in Great Britain also there are traces of volcanic action and great lava flows of the past. One of the most noted is Fingal's Cave on the island of Staffa, off the west coast of Scotland, not far from the Firth of Lorne.

Fingal's Cave is open to the ocean. It is haunted by seals and sea birds, and out of it, in times of storm, the wind comes with such a weird murmuring sound that fishermen who live and work near by call it the Cave of Music. The waves of the sea beating against an old lava mass have formed this cave. In its walls of basalt may be seen the vertical columns formed by the jointing or cracking



*Underwood Press Service*

Fingal's Cave, worn out by waves beating against the cliffs of Staffa. Here we may see some of the most remarkable basalt columns found anywhere in the world.

of the lava when it cooled, as it did in the Auvergne region already described.

Through an arched entrance rowboats can make their way into the cavern when the weather is fine. The interior is very beautiful. A vaulted ceiling of rock sixty-five feet high rises above a floor two hundred feet in length, and up and down the curving walls is every tint of yellow,



*Ewing Galloway*

Strange basalt cliffs on the islet of Staffa, off the Scottish coast. Fingal's Cave is in these cliffs. The whole mass is an ancient lava flow which formed in vertical columns when it cooled.

red, crimson, maroon, and brown. White stalactites hang from the ceiling. The floor is brightened with the olive and red of seaweed, and from it rise basalt columns, most of them six-sided, all of them vividly colored.

Fingal's Cave is famed in the old tales of Scotland as being the place where an ancient national hero named Fingal hid when pursued by his enemies. But nobody could hide there very long, for even during low tide the waves swish across the floor, and in times of storm and high tide boats cannot get into it.

In northern Ireland, on the coast of Ulster, is a low pier of stone columns running about two hundred yards out to sea, descending gradually until it is covered by the waves. This is the Giant's Causeway, another lava dike of six-sided columns, one of the finest of its kind in the world.

According to an old, old tale that was believed all over Ireland in the days when people knew nothing of geology, and when dwarfs and dragons were supposed to haunt the



earth, a monstrous fellow named Fin-mac-Coul, the mightiest warrior Ireland ever knew, once held all the territory along this coast. He was so fierce and strong that, with the exception of a chief who lived across the channel on the Scotch shore, the whole world feared him.

One day word came to Fin that his enemy boasted he would come over and conquer him.

"It will suit me well if he fares here at once," the mighty fellow thundered when he heard the news, "and verily will I make it easy for him to come."

Straightway he fell to work and built the causeway. The legend says that when completed it stretched from Ireland to the Scotch shore, entirely across the channel. Fin then waited for his enemy to come, but like most folk who boast of their intentions, the Scotch giant failed to fulfill his threat.



*Ewing Galloway*

Giant's Causeway on the north coast of Ireland. Like Fingal's Cave, this is composed of columns of basalt formed by hardened lava outflows. Note that most of the columns have six sides.

After Fin had waited long enough so that he knew the boaster was afraid to meet him, he went over the causeway and taught him a lesson. So roughly did he deal with him that nothing was ever again heard of the Scotch chief. But Fin lived for a long time afterward on the Irish coast, crossing the causeway whenever it pleased him to do so, and holding authority over the northern isle.

Finally the waves destroyed the greater portion of the stone pier which legend says Fin built as a bridge across the channel, and now less than two hundred yards of it are left.

Geologists are by no means certain that the lava pillars once reached as far as the coast of Scotland. But they do know how the causeway came to be formed. They know also that across the North Channel, off the Scotch shore, is a similar basaltic cliff on the island of Ailsa Craig, beloved of sea birds and a favorite haunt of Robert Burns.

## VII. EARTHQUAKES IN EUROPE

Earthquakes are often associated with volcanic action, and in such cases they do not extend very far away from the volcano. There are two kinds of earthquakes: *tectonic*, or those due to friction along great breaks or faults in the earth's crust, like the one that has caused disturbances on the west coast of America; and *volcanic*, which accompany volcanic action.

Earthquakes have occurred frequently in the Mediterranean region of Europe, especially in Greece and southern Italy and in the adjacent islands. Many have taken place in connection with volcanic eruptions.

Noteworthy among the places in the Mediterranean region where destructive earthquakes have occurred are Lisbon, the capital of Portugal, and the island of Ischia, southwest of Naples. In 1755 Lisbon was almost destroyed by an earthquake that threw down buildings. At the same time

great rushes of water (known as tidal waves, though they have no relation to tides) swept in from the sea, taking the lives of thousands of people. It is believed that the disturbance at Lisbon was a tectonic earthquake, along the line of a fault.

The great earthquake of Ischia occurred in 1883, sadly wrecking the town of Ischia and several other villages on the island. The loss of life was so great that for a long time afterward the little island, which had been thickly peopled, seemed almost abandoned.

The earthquake at Ischia may have been tectonic, like the one at Lisbon, but very likely it was volcanic, caused by activity within Monte Epomeo, a volcano on the island that was very active during ancient and modern times. In the year 474 B.C., over five centuries before Pompeii and Herculaneum were destroyed, an eruption of Epomeo killed a great many people and so terrified those who survived that they fled from the island, and Ischia was for a number of years deserted. Various eruptions occurred from time to time after that first great one, until the year 1302 A.D. Then came a very disastrous eruption, during which a stream of lava descended the mountain and moved down toward the sea, stiffening and hardening as it flowed. Traces of this river of molten rock are still to be seen, for it has not been wholly covered with vegetation. After the eruption of 1302 Monte Epomeo seemed to be dead, and was regarded as an extinct volcano. But during the earthquake of 1883 a large mass of earth was displaced from the mountain, leading some scientists to believe that there was activity within it, and that therefore the earthquake was volcanic instead of tectonic in origin.

## CHAPTER FOUR

### STORIED HEIGHTS

#### I. THE OLDEST MOUNTAINS OF EUROPE

AGES and ages ago, so long ago that the lands we now call Germany, France, and Switzerland had not risen from the sea and Europe was just a group of scattered islands, there were mountain ranges in the north, in Scandinavia and Great Britain. Now these are little more than hills as compared with lofty peaks in other parts of the world. They are low today because they have stood out in the weather for countless thousands of centuries and have been greatly worn down by the wash of rain and the grinding of glaciers.

This lowering of summits has taken a very long time. In a book called *The Story of Mankind*, Hendrik Van Loon quotes from an old Saxon legend that gives us some idea of the millions of years that must have passed while the high ranges were changing slowly into low ones. "Far in the north," the legend says, "is a high mountain of hard rock known as Svithjod. It is a hundred miles high and a hundred miles across at the base, and once in a thousand years a little bird comes to its summit to sharpen its beak. By that means the mountain is slowly worn away, and when it is entirely gone it will be the first day of Eternity."

The story of a mighty stone mass being destroyed by a bird coming once every thousand years to sharpen its beak seems an impossibility. It would take such a long period of time that we cannot imagine it. But it is almost as hard to imagine the countless centuries that passed while the ancient lofty mountains were being worked down into low ones, for records written upon the rocks themselves, which geologists know how to read, prove that the dwarfing of the



*Valentine & Sons, Ltd.*

The summit and rugged slopes of Ben Nevis in the Scottish Highlands, the highest peak (4400 feet) in Great Britain. Through the valley (in the lower right corner) runs a stream which we may trace from its mountain source almost to the place where it joins the river Inverroy in the valley.

great heights was almost as slow a process as the legend says will be the destruction of the rock of Svithjod.

The mountains of Great Britain are scattered in little groups, mainly in Scotland, Wales, and the northwestern part of England. Ben Lomond and Ben Nevis are the principal Scotch peaks. They are not high, being less than four thousand feet, which, as compared with the Alps, is not much of a mountain. But they are famed in history and romance, because so much has happened around and upon them. In the days before Scotland was united with England to form Great Britain, independent clans, each governed by a chief, held the land. They lived their lives, fought their battles, and worked out their problems around these northern slopes, and so Ben Nevis, Ben Lomond, Ben Vorlich, and Ben Venue have been sung in the poems and

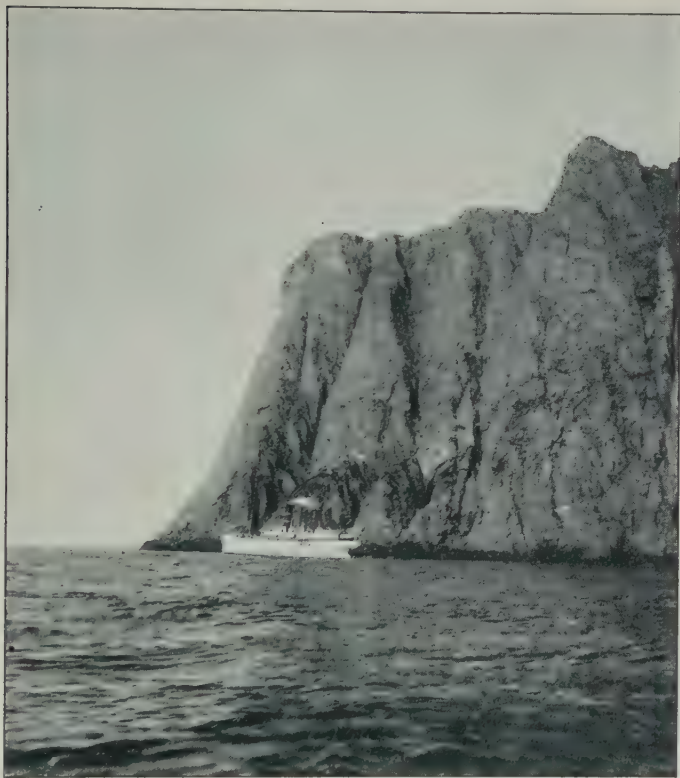


stories of Walter Scott, Thomas Campbell, and many other writers. Now the geologist adds to those ancient tales the oldest one of all, telling how, from towering heights in the past, they have come to be scarcely more than hills.

The highest peak of Wales is called Snowdon. It is so rugged that, despite its low altitude, it gives the appearance of being a lofty mountain. It is really five peaks in one, and from its crest there is a view that richly repays the climber. Because it abounds in wild cliffs and crags, scaling it off the beaten track is a feat that requires both skill and endurance and is not without danger.

England's mountains, among which nestle Lake Windermere, Coniston, and the other waters of the Lake District, are lower than those of Scotland and Wales. Scafell Pike is the highest peak in England. It rises only thirty-two hundred feet above the sea, but offers some real climbing and seems quite imposing in a region where there are no great heights. Not far from Scafell Pike are Coniston Old Man, Great End, and several other mountains which, because of their cliffs and gorges, make this part of the British Isles highly picturesque. Upon their slopes and crests, too, the geologist reads a story of the time when they were young and majestic.

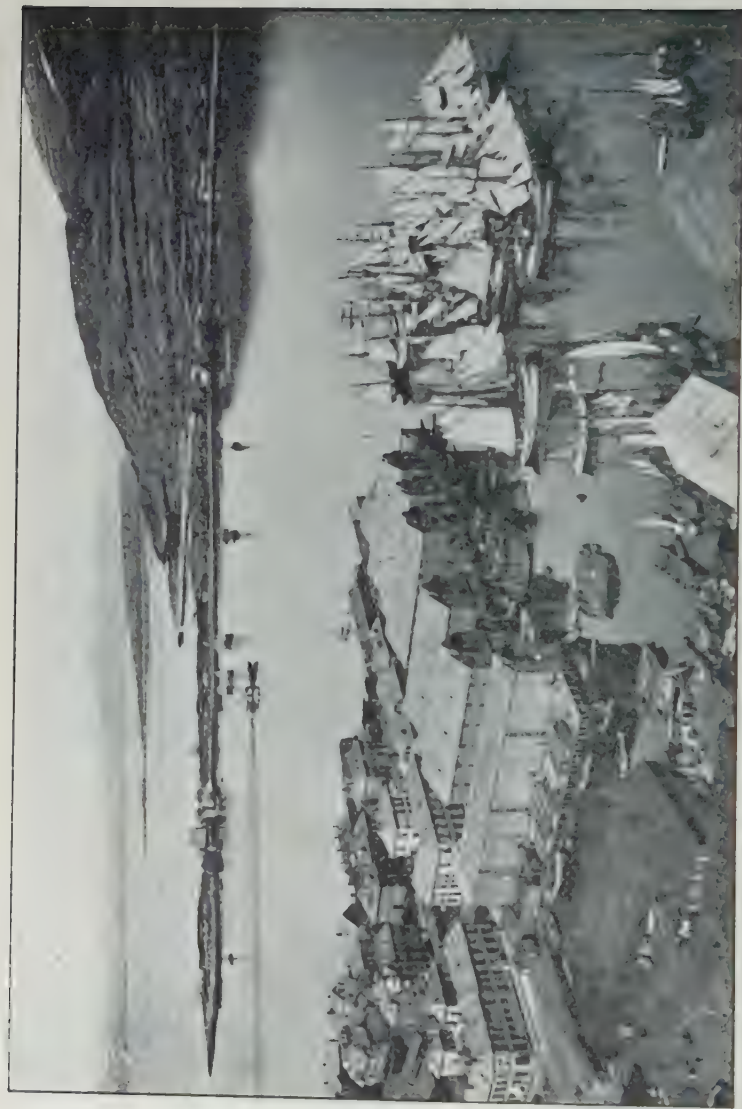
Among the oldest mountains of Europe are the Dovrefjeld, the principal range in the Scandinavian peninsula. Although once they were very lofty, they have been so much worn down by the ice and storms of millions of years that the highest peak, Snehaetten, reaches an altitude of just a little over seven thousand feet. They are covered with glaciers which run toward the valleys and, on the side of Norway, sometimes into the sea. It was these same ice streams, moving down the slopes through many ages, that carved the valleys deeper and deeper, so that when the coast line sank a little the sea came in, making the wild, deep fjords.



*Norwegian Government Railways*

"The gaunt and haggard shape" of North Cape, standing like a wedge at the point farthest north in Europe.

Among the most striking mountains of Norway are the Troldtinder, or Witch Pinnacles, in the Romsdal Valley, and the Jotunheim mountains, which are the highest and wildest of all. According to the ancient northern belief, trolls were supernatural folk with all sorts of marvelous powers, sometimes tiny creatures like gnomes, sometimes monstrous giants. There is a legend that they made the Jotunheim as a home for themselves, and peasants living near it tell many weird tales of happenings among its caves



*Hammerfest, from Gjøvik*

Hammerfest, Norway, where the sun does not set from May 13 to July 29 and is never seen from November 18 to January 23. This fishing port is the most northern town in Europe. It has a milder climate than the extreme northern parts of Alaska, which are in the same latitude.

and cliffs. In some of the villages where there has been little contact with people from the outside world, the country folk still believe these tales. It is a great experience to sit by a fireside on a cold winter night and listen while some wrinkled grandfather or grandmother tells of supernatural folk among the mountains, who are forever playing pranks upon each other, befriending mortals who have been kindly, and punishing those who deserve to suffer for their misdeeds.

At the extreme northern end of Norway on a little rocky island is the promontory known as North Cape. It reaches an altitude of less than a thousand feet but rises so gaunt and solitary out of the ocean that it seems more gigantic than it really is. In one of Longfellow's poems, *The Discoverer of the North Cape*, Othere, an old sea captain, thus describes the promontory :

And then uprose before me,  
Upon the water's edge,  
The huge and haggard shape  
Of that unknown North Cape,  
Whose form is like a wedge.

Although the "huge and haggard" promontory does rise out of the water like a wedge, it is neither the height nor the shape of North Cape that makes it celebrated. It is the northernmost point of Europe, and is constantly visited by travelers from every land, who go there to view one of the most interesting sights to be seen upon the earth — the midnight sun. Within the Arctic Circle the sun never sets in summer but shines all night, and it is worth a long journey to behold it. During the winter, on the other hand, the sun never rises north of the Circle, and the landscape is then not in the least cheerful.

When the great glacier covered the northern part of Europe, it tore vast quantities of material from the Scandinavian mountains, carried it southward, and piled it up to



Map showing coast lands built up from materials brought down from the Scandinavian Peninsula by the great glacier. Rivers and waves have greatly changed the shore line. The long sand bars on the southern shores of the Baltic have been built up by wave action. Denmark and the neighboring regions to the west have been slowly sinking and the land is being torn down. Notice the numerous glacier-made lakes, especially in Sweden and East Prussia.



form the flat sandy stretches that border the Baltic Sea — Denmark, northern Holland, northern Germany, east Prussia, and the countries along the Baltic on the east. After the glacier retreated, the rivers began to carry some of the loose material into the numerous lakes or into the sea. Along the shores the waves and strong currents picked up sand and other fine material, swayed it back and forth, and finally deposited it in bays or other places where the water was quiet.

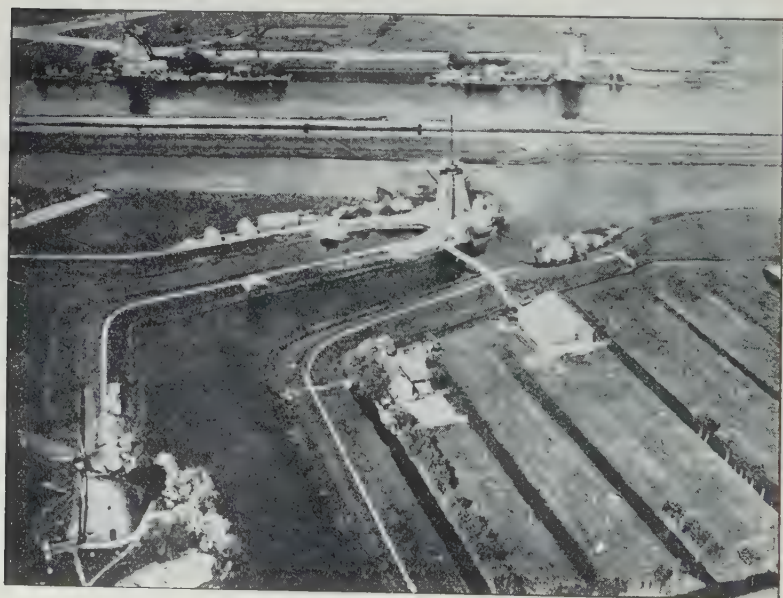
In the great sandy flats that lie in the vicinity of Danzig, arms of the sea have thus been shut off by sand bars and made into lakes. There are five large lakes along the east Prussian coast and several small ones, each of which was formerly part of the ocean. Centuries ago there were many others, but little by little they became filled with deposits of sand and with vegetation and were transformed into land.

The southern part of Holland was built up with deposits brought by the Rhine and the Meuse from the mountains to the south. Ocean inlets blocked by sand bars became lakes. There were, in fact, so many bays and lakes in Holland that there would have been little land for farming purposes, had not the industry and ingenuity of the Dutch people found a way of reclaiming them. They dammed up the bays with walls of clay, pumped out the salt water, and drained the lakes. In their work of reclaiming the land from the sea, the Dutch people learned that windmills would serve them excellently for pumping out the water, and that canals could be built to carry the surplus away. So Holland became "the land of windmills," for the tall, picturesque buildings with revolving wheels or arms are to be seen throughout the country.

Tracts of land that have been reclaimed from the old bays and lakes of Holland are called *polders*, and a large part of the country is composed of them. For the most part they are lower than the sea level and the outlet channels of the

Rhine and the Meuse. So, in order to keep the water from flowing over the country, the people have built sea walls called dikes along the shore, and these must be watched very carefully, because an unrepaired break is sure to cause a flood. Therefore it is necessary to keep a large company of inspectors and engineers on duty to report and repair the slightest damage before it is too late.

Even the children in Holland know the danger of a break in the sea wall, and forget everything else upon hearing a sound of trickling water that may mean a crevice in the embankment. In a poem called *The Leak in the Dike*, Alice Carey tells how a boy, finding a hole in the sea wall, risked his life to keep it closed until help came. If one stands at high tide at the foot of one of the dikes and hears



International

Polders, canals, and windmills of Holland as seen from the air. These stretches of land, called polders, have been reclaimed from the sea or a lake by draining off the water.



*Donald McLeish*

A village in Zeeland (a province of Holland) built on land that is lower than the sea. The high sand dunes protect it from the North Sea.

the breakers beating against the other side, fifteen or twenty feet above his head, he understands why the people are so watchful. An ancient Dutch proverb says, "God made the sea; we made the shore." And the Hollanders know the shore they have made must be constantly guarded if they would live in safety.

Passing up the Meuse in a steamer, one may look over the banks and see Dutch farms lower than the surface of the river itself, and realize what a break in a dike would mean. Yet once, long ago, the Hollanders purposely opened the sea walls and flooded the country, destroying homes and crops in order to save themselves from the Spaniards, who had obtained possession of the land. Failing in every other way to drive the invaders out, they turned the ocean in and drowned them out. But it involved a long and tedious process of restoration and pumping afterward to

get rid of the salt, which destroys grain or grass, so they would be sorry to do it again. Since the days when the Spaniards were driven out, it has become a common saying that "The Dutch have taken Holland." Having taken it, they mean to hold it against all comers.

## II. THE HIGHEST MOUNTAINS OF EUROPE

### THE RANGES OF THE ALPS

The chief mountains of Europe, and the most widely famed, are the Alps. They are young as compared with the mountains of Scandinavia and Great Britain, and the loftiest peaks are very high, although they have been terribly scored by ice and storms since they were raised from the sea. The Alps lie chiefly in Switzerland, which they almost fill, but are not confined to that country. They spread out in every direction into Austria, Germany, Italy, and France.

The central mass of the great group of the Alps, against which all others may be said to lean, is the St. Gotthard, from which other mountain masses radiate in different directions like outspreading arms. Each of these groups is snow-crowned, and down their slopes glaciers slip toward the valleys. The chief ranges are the Chamonix Alps (on the Swiss-French-Italian border), the Pennine Alps, the Bernese Oberland, the Bernina Alps, and the Alps of Dauphiné, which lie across the border wholly in France.

### MONT BLANC AND CHAMONIX

The highest peak of the Alps is Mont Blanc, which is not in Switzerland; the province of Savoy, in which it stands, was in 1860 ceded from Italy to France. It towers over fifteen thousand feet above sea level, a great white dome surrounded by sharp minarets or spires of granite, locally known as the Aiguilles, the French word for needles.





*Ad Astra Aero*

Mont Blanc, "the monarch of mountains," rising like a wall high above the valley of Chamonix. Only from an airplane could we get such a view of this peak in the Alps, which is the highest in Europe. The Glacier des Bossons is near the middle of the picture.





Map of the Alpine country in the heart of Europe. The mountain ranges fill Switzerland and spread into France, Germany, Austria, and Italy. Notice the sources of the main river systems, especially the Rhine, the Rhone, and the Po.

Mont Blanc is a part of the Chamonix range, overshadowing the valley of Chamonix, a narrow river basin with the little hotel town of Chamonix, which the mountains wall in on the south. The valley of Chamonix, with snow-covered peaks towering above it and swift streams gray with glacial clay foaming along its floor, is one of the most imposing in the world. Men of many lands and times have been inspired by the grandeur of the Alpine giant that looms over it. Lord Byron wrote these lines :

Mont Blanc is the monarch of mountains;  
They crowned him long ago,  
On a throne of rocks, in a robe of clouds,  
With a diadem of snow.

#### THE PENNINE ALPS AND THE MATTERHORN

East of the Chamonix Alps, along the boundary between Switzerland and Italy, runs the long chain of mountains called the Pennine Alps, in the heart of which is a deep valley with the little town of Zermatt. High above Zermatt, to the southeast, is broad, snow-covered Monte Rosa, the second highest peak of the Alps. Monte Rosa stands on the border between Switzerland and Italy. From the Zermatt side it seems dome-shaped, but on the south it has gigantic precipices, very rarely scaled by the mountaineer.

Two miles west of Monte Rosa, likewise on the boundary between Switzerland and Italy, is the white peak of Lyskamm. Farther west in the same range are the brother peaks, Castor and Pollux, known as Zwillinge, or twins. Then comes the Breithorn, high and snow-covered, but without cliffs anywhere, and therefore of all high mountains in Switzerland the easiest to climb. Beyond the Breithorn is the Matterhorn, the most glorious peak of the Alps. Thus the valley of Zermatt is guarded by a mountain group without an equal in all Europe.

*Donald McLeish*

The Matterhorn, the most glorious peak of the Alps. Its sharp pyramid reaches up a mile beyond the mountain range at its base. It is 14,780 feet high. The upper cabin, or refuge hut, is near the "shoulder" on the right side of the picture, and the lower cabin is near the glacier tips on the left. The photograph gives no idea of the relative distances.

The Matterhorn is one of the most magnificent mountains that ever pierced the clouds. Other peaks in Switzerland are loftier. Mont Blanc stands a thousand feet above it, and Monte Rosa over four hundred, but no other mountain in the world makes such appalling use of its height. It reaches a mile above the lofty range on which its base is placed. It is like a sharp, three-cornered pyramid. No glacier has rounded the angles of the Matterhorn into curves, for it is too steep for snow to cling to; all that falls on it winter or summer rolls down the sides and lies in three great ice heaps at the bottom.

Because of its exceptional sharpness, the Matterhorn was

the last peak in Switzerland to be climbed. For many years it was believed no human being could scale it, as one daring spirit after another who tried to make the ascent failed. Stories spread among the peasantry of supernatural creatures who held the mountain for their home and hurled mighty rocks at any mortal who dared approach it. But in 1865 the Matterhorn was finally conquered by the celebrated English mountaineer, Edward Whymper, and three companions. With Michel Croz of Chamonix, one of the most noted guides of Switzerland, as chief guide, and three helpers, they succeeded in reaching the top. On their return, the rope that bound the climbers together broke. Croz and three Englishmen, Hudson, Hadow, and Douglas, were hurled over three thousand feet into the abyss at the foot of the almost vertical north wall.

Whymper and the three assistant guides escaped, one of them, Peter Taugwalder, to survive the tragedy for fifty-eight years, during which time he made one hundred and twenty ascents of the Matterhorn. The climb became easier when ropes had been placed in critical places, although it is never free from danger from falling stones detached by the melting of ice in joints in the rock where water has frozen.

In the summer of 1881 Dr. Jordan, the senior author of this book, was a member of a party that ascended the Matterhorn. He has told about it in *The Days of a Man*, and we repeat the story as it is given there.

We had wandered about Zermatt for a few days, and all the while the mountain hung above our heads and dared us to come. And so one evening, as we watched the moon sink behind its towering obelisk, Gilbert said to Beach, "We must do something big before we leave this place. Let's go up the Matterhorn!" And Beach replied, "All right. I'll go if Jordan will."



But I held back, knowing that it would be a hard road for a heavy man to travel. Besides, the tragedy of the first climbers was fresh in my mind. Then Gilbert said, "You have talked and talked about mountains, and you've never done a single big thing among them, and now it's time you did!"

I remembered, moreover, that several earnest scientists had attempted to make the ascent. Tyndall, for instance, had thought it worth while to try again and again, year after year; and so had my Italian namesake, the geologist Giordano. So at last I fell into line, and seeking out Jean Baptiste Aymonod (we called him "John the Baptist"), who had led us from Valtournanche, in Italy, engaged him as chief guide and arranged to get off before morning. We then strolled pensively through the little graveyard to the tombs of Hadow, Hudson, and Michel Croz, the unfortunates with Edward Whymper on the first ascent in 1865.

The party as finally made up consisted of Melville B. Anderson, Charles H. Gilbert, William W. Spangler, William E. Beach, Walter O. Williams, and myself. Our guides were five in number: "John the Baptist" — a young man of remarkable strength, skill, and loyalty, afterward well-known and appreciated in the Pennine Alps — Victor Macquinaz, François Bic, Daniel Bic, and Elie Pession — all from Valtournanche, a French colony within the confines of Italy.

When we started out shortly after midnight, the moon was full and hung gracefully over the south shoulder of the mountain, and the sky was without a cloud. Up through dark fir forests we went, by the side of a foaming torrent, then over flower-carpeted pastures and steep grassy slopes, dominated by the great pyramidal mass, the glistening snows of the Dent Blanche and the Breithorn flanking it on either side. At sunrise we reached the cabin, a fairly comfortable shed at the foot of the peak





*Wehrli, Ltd.*

The valley of Zermatt with the Matterhorn standing guard above it. Through the valley runs the Visp River, which has its sources in several of the great glaciers of the Alps.

itself. Within, the walls bear inscriptions in many tongues. One reads as follows :

Little Matt Horner  
Sat in the corner  
And vowed he would not be climbed;  
We tried it, you know,  
And found so much snow  
We very politely declined.

After a brief rest we now set out on a long and most trying climb, the many details of which I need not repeat here. But far below us, even from the very start, yawned the deep abyss of the Bergschrund, a chasm produced by the slipping away of the Furggen Glacier from the mountain. Tied together in three groups, about ten feet apart, we moved, only one at a time advancing in each group and not until after the preceding man had secured a good foothold. The constant question of the guides was "*Êtes-vous bien placés ?*" (Are you well-placed ?) For not to be well-placed even for a moment was a menace to one's associates.

The steepest pitch of the whole ascent is just below the tiny refuge hut near the shoulder, which I describe later on. Down the face of that seventy-foot precipice dangled a rope made fast to an iron staple above, but swinging loosely below so that one could climb hand over hand by resting his toes on projecting irregularities of the mountain side. That ropes were placed in difficult stretches along the way we already knew; still we had hardly expected to be suspended over infinity! John, as usual, went up ahead as far as his tether permitted, then called to me to follow. The rope was white with frost, and I thought I could manage better with gloves. This was a mistake, for when I had to trust my full weight, I felt myself slipping downward, at first slowly, then more swiftly. It was not a pleasant sensation, though I hoped to stop when I reached the knot

at the end of the rope; otherwise we might all form the nucleus of a rock avalanche moving toward Zermatt. The knot held, however, and gloves off, I tried again, this time with better luck, after which the others followed successfully.

After a few minutes' rest in the hut, we next passed up and along the sharp *arête* or angular edge of the mountain, thereby avoiding the risk of falling stones. This at one place became exceedingly narrow, and on the north side, as we inched along, we looked down a precipice of four thousand feet to the Tiefenmatten Glacier. From a cliff not far above us at that point, Whymper's companions fell the whole distance to their death. I asked John about it, but he would not talk. "I was not there," he said.

Clouds now gathered suddenly, enveloping us in a gusty snowstorm and drenching the valley with rain. We lost sight of the earth altogether; everything below was a fathomless abyss. As we turned along the more level shoulder toward the east face, Aymonod called my attention to a heap of stones, "*Voilà le chalet de Monsieur Vimpère.*" (There is the hut of Mr. Whymper.)

The cliffs which now confronted us were distressingly difficult even with the aid of the dangling ropes, almost impassable without them. Yet someone had carried up those ropes and the iron staples which hold them. That man was "John the Baptist." They constitute a part of *l'échelle Jordan* — the Jordan Ladder — so named for Leighton Jordan, an English mountaineer on whose generous initiative they were bought and placed.

The "ladder" once ascended, the few hundred feet remaining presented an easy slope on which our sole difficulty was the violent wind. At noon we had reached the summit, a narrow crest about twenty feet long and from one to three feet wide, rising to a point at the southern end. Only four of us could safely squat on it at once. It was as cold

as midwinter. Snow fell thick and fast. The wind, moreover, whipped us in savage whirling gusts so that we dared not rise to our feet lest we be literally blown away and make a strange figure sailing over Italy tied together with a rope.

Most of the time we could see nothing; but occasionally a break in the storm would give us a green glimpse of the Tournanche village of Le Breuil two miles below; and once the Dent Blanche disclosed her snow-crowned head. Writing our names on a card, we placed it in an anchored bottle, the Matterhorn's register of guests. Victor then broke from the tip of the mountain a fragment of the hard, dark green brittle hornblende of which it is made, a souvenir which I still possess, and we started back.

Halfway down to the hut Gilbert was suddenly struck by a rock weighing a hundred pounds or so, which had slipped from under the feet of the last man and gone howling down the mountain side. He received a savage gash across the forehead and was knocked senseless out of our sight, though still held by the rope. We were all paralyzed for an instant; but John soon rushed down to me so that I might give the rope to Victor, who then hurried to Gilbert's rescue. Happily his steel-brimmed hat, sliced by the sharp edge of the rock, had offered a momentary resistance, and so saved his life.

We now moved very slowly, Victor half leading, half carrying Gilbert, dazed and blinded with blood, but still courageous. "*C'est un homme fort et brave,*" said John. (He is a strong and brave man.)

As we descended, the treacherous character of the Swiss face of the mountain became increasingly evident and alarming. As a matter of fact, the whole outer coat of the mountain is loose, scarcely a rock anywhere being firmly attached. For into all the joints of the strata, water from melting ice finds its way, to freeze at night and thereby widen the joints so that the outer blocks, large and small,



*Donald McLeish*

Saved by the rope; a critical moment following a slip on a dangerous ice slope in the Dauphiné Alps.

are daily pushed toward the edge. Thus nothing is stable, and each year the Matterhorn offers everywhere a new face to the weather. But the dip of the strata being strongly to the south, on the Swiss side the loosened blocks remain poised on uptilted edges until thrown off, when the fall of a single one will start a regular shower below. In the afternoon the danger is most acute, the ice cement having thawed and released the débris. On the Italian front, on





Lodgings for the night on the Matterhorn, 12,256 feet above sea level. In this stone den, called the upper refuge hut, on the edge of a 70-foot precipice mountain climbers may find refuge till daylight. The picture shows slopes of the Dom across the valley of Zermatt.

the contrary, a rock drops as soon as loosened, and so without starting a volley.

Working along, we soon heard a terrible uproar, and three or four rods away saw an immense avalanche of rocks — a dozen of them as large as a wagon, with hundreds of little ones yelping in the rear. "*C'est une montagne terrible!*" (It is a terrible mountain!) exclaimed John. Pession, who had been in mortal fear ever since the accident, was worse than useless for the rest of the day. "You must pardon him," said John; "he has a wife and children in Valtournanche."

At six o'clock, after hairbreadth incidents, we reached the hut, and made Gilbert lie down on the few armfuls of hay, where he soon went to sleep. John now decided to remain there over night with Victor, Spangler, and myself. We five thus took lodgings 12,256 feet above the sea. The others, not without adventures, reached the cabin in safety.

Our refuge was a sort of stone den six feet wide by ten long and five high on the inner side, crowded on a narrow flat ledge between a protecting pinnacle and a precipice, the only possible place anywhere about. Three coarse blankets, a little bench, a tin bucket, and a basket of shavings made up the equipment.

John sent us immediately to bed — one on each side of Gilbert to keep him warm. But nothing kept us warm. Our clothes were wet, and my off side abutted on a frosty rock which carried away heat faster than I could generate it. John and Victor lay on the bare ground. The snow thawed on the roof, and little streams of sooty water trickled over our faces. All night long our patient dreamed of climbing mountains. Once he shouted, "*Attention! Attention, toujours!*" At another time he called out, "Here we will stop walking and take wheelbarrows!" At intervals the guides kindled a fire of shavings to make a drink of chocolate all around.

The storm cleared early in the night, and a sharp, cutting cold penetrated our fastness. From time to time the mountain snapped as the water froze in its joints, and occasionally we heard the loud roar of rock avalanches. In the morning it was crystal clear. Above and below the whole majestic Matterhorn mass shone white with new-fallen snow or glistened with frost. Over the deep valley of Zermatt clouds hung white and heavy, setting us off, as it were, in a glittering upper world. Far in the distance rose the giants of the Bernese Oberland; nearer the Dent Blanche, the Weisshorn, the three peaks of the Dom, and, to the right, the long crescent of the Breithorn, Zwillinge, and Lyskamm, which culminates in Monte Rosa. It was the sight of a lifetime.

Our invalid awoke cold, disgusted, and impatient, and his swollen eyelids looked each like a ripe plum. We now decided that he must go down to Zermatt with John and Victor, while Spangler and I should wait until they came back for us, which might be the next day, and might be never! But, as the Jester said in the forest of Arden, "Travelers must be contented."

Shortly after they left, however, we heard shouting from below, and soon the two Bics appeared, having come up from the cabin where they and the others had spent the night. We four then began to descend very slowly, for going down was far more trying even than going up. Once when François by accident hit me in the eye with the head of his alpenstock, and I said nothing, he remarked, "*Quelle bonne disposition!*" (What a good disposition!) At this I smiled, and again said nothing.

About noon the seven of us had all reached the cabin, where we found the doctor from Zermatt and four able-bodied fellows with a sedan chair for Gilbert. There were also several Valtournanche men, who had got wind of our trouble and come up over the Matterjoch, bringing food,



*Donald McLeish*

The Matterhorn (at the left) and the Dent Blanche (at the right) as seen from Fee Pass, which is 12,505 feet high. Midway between these two peaks we see the snowy dome of Mont Blanc, 55 miles distant. Dent Blanche (White Tooth) was first ascended in 1862, three years before the Matterhorn was conquered.

wine, and a rope. For a moment I thought that we might have to fee the whole population, but when they saw we were safe, they melted away. Pure kindness had brought them, and we acknowledged their fine human friendliness in the same spirit. That incident typified one reward of high mountaineering as expressed by Edward Whymper, who writes gratefully of "courtesies received from strangers' hands, trifles in themselves, but expressive of that good will which is the essence of charity."

Our welcome in the village was most enthusiastic, and the *Matterhornbesteiger* (climbers) were the heroes of the hour. In the foreign chapel prayers were offered for Queen



*Ad Astra Aero*

Airplane view of miles upon miles of snow-covered summits in the Swiss Alps. The sharp peak in the foreground is the Bietschhorn in the Bernese Oberland. The distant range lies far to the south, and through the valley between (not visible in the photograph) flows the Rhone River. The Bietschhorn is extremely difficult to climb. It was first ascended in 1859 by an Englishman, Sir Leslie Stephen.

Victoria of England and for President Garfield, then lately stricken down, and thanks were given for our safe return.

Three days after Whymper's successful ascent Jean Antoine Carrel, the most noted guide of Valtournanche, led a company of his fellows to the top of the Italian side, steeper and more ragged than the other, but free, as I have said, from rock avalanches. In 1879 A. F. Mummery, an English mountaineer, made the ascent up the apparently utterly inaccessible northwest (Zmutt) angle, a forlorn area of merciless rock through which, according to a local saying, "God passes only by night." A number of other mountaineers have since followed Mummery.



Our course was essentially that taken by Whymper, the point being to keep as near as possible to the saw-edged northeast angle, out of reach of volleys of stone. Within recent years the trip has been made easier by better accommodations and various devices. A good hotel now stands near the Schwarz-see or Lac Noir (Black Lake), a tarn which lies two thirds of the way up to the cabin. Wire ropes, I understand, have been installed where needed, and the whole course sways more closely to the northeast ridge.

The French call the Matterhorn *Mont Cervin*, a name that comes from the Latin word *cervus* — stag — because, viewed from a distance, it suggests a gigantic, rearing stag. Some years ago Dr. Jordan wrote the following verses about the peak :

#### THE MATTERHORN

Great, crumbling mountain of the rearing stag,  
'Tis thus, O Matterhorn, thou seemst to me;  
O Mons Cervinus, thou a stag must be  
And crumbling, too, in each frost-bitten jag!  
And I, once held by thee, as in a hand  
High overtopping loftiest Switzerland,  
A tiny speck of life 'mid giants play,  
As flooding tides may toss a fleck of foam!

Life is immortal! Thou must pass away,  
The loftiest summit towers for but a day,  
But I, undying, æons hence shall come  
To cast upon the spot where thou dost lie,  
This for remembrance, fragrant rosemary!

Extending northward from Monte Rosa is a singularly picturesque ridge of mountains, the Mischabelhörner, the highest peak of which is called the Dom or Mischabelhorn. With its neighbor, the Täschhorn, it would form one of the

most impressive groups in the Alps if it were not flanked by Monte Rosa and the Matterhorn, whose precipitous height engrosses the attention of the traveler and makes the Dom seem less majestic than if it stood alone.

Opposite the Dom, on the west side of the valley, rises a superb mountain nearly fifteen thousand feet high, presenting a most impressive white front as seen from Zermatt. This is the Weisshorn, one of the last Alpine summits to be scaled, and one of the most repaying when climbed, because of the glorious view from its summit. For a long time it was believed to be unconquerable, but in 1862 it was ascended by Professor Tyndall, and since then many adventurers have reached its crest. But they go with considerable danger, even with modern mountaineering devices, for the way leads over steep and slippery ice.

About eight miles southwest of the Weisshorn is the Dent Blanche or Steinbockhorn, also one of the most trying and difficult Alpine summits to scale. In 1862, after many parties had given up in failure and some in tragedy, two Englishmen named Kennedy and Wigram successfully made the ascent over the slippery ice, which is especially hard on the hands.

The mountains that stand on the border between Switzerland and Italy have both German and French names in common use, and usually an Italian one also. The reason for this is that along a border between countries where different languages are spoken, those in some of the villages use one tongue, and in others another. Valtournanche, near the foot of the Matterhorn, lies in Italy; but the inhabitants speak French, and here the French name, Mont Cervin, and not Matterhorn, is heard. The Italian name, Monte Silvio, is more rarely used, because almost no one in the valley speaks Italian.

The scenery around Zermatt is the most magnificent in Switzerland. A great deal of poetry has been inspired by



*Swiss Federal Railways*

A wind-swept pasture close to the summits in the Upper Engadine. Shepherds come here with their flocks each year during the brief summer season. In the background are the Bernina Alps with their small glaciers.



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The magnificent Jungfrau (at the right), always covered with dazzling snow. It is 13,666 feet high. Between the high meadow in the foreground and the great mountain chain lies the deep and narrow valley of Lauterbrunnen (not visible in the picture).

it, but nowhere has the grandeur of this region been more vividly described than by the American poet, Thomas Bailey Aldrich, in the following lines :

Stand here and look, and softly hold your breath  
Lest the great avalanche come crashing down !  
How many miles away is yonder town  
Set flower-wise in the valley ? Far beneath,  
A scimeter half drawn from out its sheath,  
The river curves through meadows newly mown ;  
The ancient water courses all are strewn  
With drifts of snow, fantastic, wreath on wreath,  
While white against the turquoise blue  
The Alps like towering campanile stand —  
Wondrous with pinnacles of frozen rain.  
O tell me, Love, can this be Switzerland,  
Or is it but the frost-work on the pane ?

THE BERNESE OBERLAND AND THE VALLEY OF  
LAUTERBRUNNEN

North of the Pennine Alps, with their towering heights of the Matterhorn, the Weisshorn, the Dom, and Monte Rosa, is the Bernese Oberland, a majestic range which includes many peaks famed in the history of mountaineering. Alp scaling is a sport of comparatively recent date, only a hundred years old. Before that time the mighty uplands of Switzerland were known as *montagnes maudites* — accursed mountains — and were dreaded by all travelers who had to cross them.

The most noted peak of the Bernese Oberland is the Jungfrau, although it is not the loftiest, but, like the Matterhorn, makes the best use of its height. Very steeply it rises, snow-wrapped from crown almost to base, above the valley of Lauterbrunnen.

Far back in 1811 the Jungfrau was climbed by two brothers living near its base. Since then it has been often ascended, and a cog-wheel railroad, or *funiculaire*, leads up from the





*Wehrli, Ltd.*  
The lovely sheltered valley of Lauterbrunnen, a break in the mountain wall that was carved deep by an ancient glacier.  
The beautiful Staubbach Fall makes a leap of 980 feet into the valley. Slopes of the Jungfrau appear at the left.

valley, through a tunnel nearly five miles long, to a high pass — the Jungfrauoch.

The Jungfrau, rising sheer above the valley with no foothills to hide it, can be seen for a great distance from the north, and has been the inspiration of many poets. Among the verses written around it are some from *The Terrace at Bern*, by Matthew Arnold, who, on returning to the region after an absence of ten years, penned these lines :

Ten years! — and to my waking eye,  
Once more the roofs of Bern appear;  
The rocky banks, the terrace high,  
The stream! — and do I linger here?

The clouds are on the Oberland,  
The Jungfrau snows look faint and far;  
But bright are those green fields at hand,  
And through those fields comes down the Aar;

And from the blue twin lakes it comes,  
Flows by the town, the churchyard fair;  
And 'neath the garden walk it hums,  
The house! — and is my Marguerite there?

In the heart of the Bernese Oberland lies the valley of Lauterbrunnen, which ranks with Zermatt and Chamonix among the most widely famed of Swiss valleys. The name, which means “nothing but springs,” comes from the countless gurgling springs that overflow and tumble in waterfalls down the great cliffs to the river Lutschine. This valley was once a broad breach in the mountain wall, afterward carved wider and deeper by the ice, and, like the Yosemite, is a testimonial to the power of vanished glaciers.

In many ways Lauterbrunnen is comparable to the Yosemite; it is on a smaller scale, but has higher peaks around it. One of its waterfalls, the Staubbach, is comparable to the Bridal Veil Fall of the Yosemite, but is higher; both resemble a silvery streamer wafted to and fro by the wind.

Besides the Staubbach, there are other cascades in the Lauterbrunnen: the Trümmelbach Fall, the Schmadribach, and others with names equally long and difficult. But to one who understands the language they are neither difficult nor long. *Bach* in the tongue of Switzerland means brook. Trümmelbach Fall is the cascade of the Trümmel Brook; the Schmadribach, at the very head of the valley, is the fall of the Schmadri Brook; and the Staubbach, that of the Staub, or Dust Brook, which falls in fine spray resembling a cloud of dust in the sunlight.

The highest summit of the Bernese Oberland is the dark Finsteraarhorn, a difficult peak to reach or to climb, the center of a cluster of mountains at the head of the river Aar. The mountains and glaciers at the head of the Aar — Lauteraarhorn and Agassizhorn with their ice streams — were the scene of the first studies of glaciers made by Agassiz while he was a professor at Neuchâtel, and to the geologist the region is among the most interesting in Switzerland.

#### THE BERNINA ALPS AND THE ENGADINE

Lying along the border of the canton of Grisons, or Graubunden, in southeastern Switzerland, and extending over into Italy, is a range of rugged peaks and narrow passes in which are numerous brooks and waterfalls. These are the Bernina Alps. The Piz Bernina, over thirteen thousand feet high, is the loftiest peak of this range. Across the border, in what was once Austrian South Tyrol but is now part of Italy, is the Ortler, reaching an altitude of nearly thirteen thousand feet. The Ortler — or Orteles, as the Italians call it — is one of the finest peaks of the eastern Alps, and before they knew much of other regions, those living within sight of it believed it to be the loftiest in Europe.

Just north of the Bernina Alps is a broad valley called the



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The edelweiss, emblem of the Swiss mountains. This little plant, only about six inches high, grows in nooks too cold for any other plant. It has white unfading flowers, with a soft woolly covering that gives protection from the icy air.

Engadine. Through it flows the river Inn, an ice-cold, sparkling stream which fills three or four beautiful lakes, then runs northeastward and across the border into Austria until it comes to Innsbruck, the chief town of the Austrian province of Tyrol. From there it moves on to join the Danube.

The Engadine lies very high and has the coldest climate of any of the large valleys of Switzerland. People who live there say they have "nine months of winter and three months

of cold," and some tourists declare it is winter all the time. Frost and snow in August are by no means uncommon. Yet in the spring and summer the days are delightful, with an abundance of mountain flowers; and in the winter the climate is so bracing that it is very healthful.

The chief town of the upper Engadine is St. Moritz, famed for its winter sports, and visited each year by hundreds of people who go there for the skiing, tobogganing, and various other amusements possible only in lands of abundant snowfall.

Because of its bracing air and its mineral springs, whose waters are curative in many ailments, St. Moritz is noted also as a health resort. As far back as four centuries ago, a famous physician, Paracelsus, used the waters of St. Moritz in treating his patients, and because such benefit came from them superstitious people believed he had bewitched the springs.

Since the day of Paracelsus countless other physicians have used the waters of St. Moritz with good results, and now that men have come to understand some of the mysteries of nature, we know that their healing properties are in no way due to witchcraft, but to the mineral substances they contain.

The long valley of the Engadine abounds in lakes, streams, and picturesque villages, with chalets nestled along the mountain slopes among forests of larch and pine.

This is the most famous clock-making and wood-carving region of Switzerland. During centuries past, timepieces built by the peasants during the long winter went forth to mark the hours for the rest of the world. From this valley still go clocks and watches, chests and all sorts of wooden ornaments, so beautifully carved that they are works of art. The people of the Engadine are also excellent candy makers, and many of them used to go to various parts of the world as confectioners.





*Ad Astra Aero*

Airplane view of a portion of the Upper Engadine Valley, with three lakes and the village of St. Moritz, 6000 feet above sea level. The river Inn flows through this valley for 55 miles, then across the Tyrol and onward to join the Danube.

## THE CHARM OF THE ALPINE VALLEYS

The valleys of Chamonix, Zermatt, Lauterbrunnen, and the Engadine are the most noted in the Alps, and each deserves every word of praise said or sung of it. Each is in its way perfect, although no two are alike. Chamonix, guarded by the vast dome of Mont Blanc, is best characterized as majestic; Zermatt, with the Matterhorn, the Breithorn, and Monte Rosa standing sentinel above, is overpowering. The Engadine is nobly beautiful, and Lauterbrunnen is superb with its huge snow wall of the Jungfrau chain and its delightful waterfalls.

In Italy there are several Alpine valleys, scarcely less celebrated and beautiful than those of France and Switzerland. Chief of these is Val d'Aosta — the valley of Aosta — lying near the foot of three great peaks, Mont Blanc, the Matterhorn, and Monte Rosa. Through the valley of Aosta flows the river Dora Baltea, chief northern tributary of the upper Po. This stream, called the Doire in its higher reaches, rises in the southern glaciers of Mont Blanc, then goes brawling down the glorious Allée Blanche (White Alley) to Courmayeur, sometimes spoken of as the Chamonix of Italy. Along its banks are somber pine forests, separated by flowery pastures. Here and there are ruined castles, some of them built by the Romans. Northward into Switzerland extends the pass of the Great St. Bernard.

Not far from the valley of Aosta lies Val Tournanche, through which flows the Marmore, a clear, swift stream making its way amid beautiful glens and uplands. Val Tournanche is the nearest valley to the Matterhorn on the Italian side, and the starting point for parties setting forth to climb the southern slope of the great mountain. Just beyond Val Tournanche rise also the Breithorn, the Dent d'Hérens, and several other lofty summits. From this valley the Matterjoch or Théodule Pass leads through to Zermatt in Switzerland.



*Ewing Galloway*

A mountain pasture near St. Moritz in the Upper Engadine. During the short summer season great varieties of blossoms make brilliant patches of color in the grassy places.

In one respect all the Alpine valleys of Switzerland, France, and Italy resemble each other. They are walled in by domes and pinnacles of snow and ice. They are alike in another respect also, because in summer the meadows that clothe the lower slopes of the mountains are starred with flowers. Many varieties are found here — gentian, violet, cyclamen, crocus, and alpen rose — not really a rose but a dwarf rhododendron. Far up where the snow has lately melted, grows the edelweiss, the most widely known blossom of the Alps, a white everlasting flower, emblem of the Swiss mountains, much used by the wood carvers in their designs.

In summer, too, the alpine glow touches the western slopes with exquisite color. Reflecting the hues of sunset clouds, it casts a rosy red or crimson light on the great fields of



*Donald McLeish*

Calling the cattle home from the high pastures. The enormous Alpine horn is in general use in the Swiss mountains. This chalet is near Grindelwald in the canton of Bern.



snow. And at times through the day one can hear the voices of shepherds yodeling to each other, and the strains of the Alpine horns with which they call their flocks. Yodeling is an odd and charming use of the singing voice by Swiss and Tyrolese mountaineers, who, by a peculiar trick of suddenly changing from chest to head tones, cause the notes to echo for a long distance. Some Alpine shepherds yodel so skillfully that the sound of their voices carries for several miles.

#### THE MOUNTAIN PASSES INTO ITALY

If the mountain ranges of Switzerland were solid, unbroken walls of peaks, fewer people would visit that country, because it would be almost impossible to get through from one part to another. But it happens that in numerous places these mighty uplands are broken by passes. One of the most widely known is the St. Gotthard. About a hundred years ago a carriage road was built through this pass. Then, in 1872, to make possible the construction of a railroad that would shorten the distance between Lucerne and Milan, there was cut through the mountains from Flüelen to Bellinzona a series of tunnels that is one of the greatest achievements of modern engineering. There are eighty separate tunnels, seven constructed in the form of great loops, or corkscrews, in order to make the ascent more gradual for the trains.

Another famous Alpine pass is the Simplon, on the border of Italy and the Swiss canton of Valais. Over it runs a highway built by Napoleon in 1800. Underneath the pass the great Simplon Tunnel, the longest in the world, cuts through the mountains and makes possible another shortened railway route between Switzerland and Italy.

There are many other Alpine passes, over some of which highways or railroads extend, while across others there are only footpaths. Between the Matterhorn and the Breit-





Holmes, from Galloway

The St. Gotthard Pass between Switzerland and Italy. The automobile road crosses the bridge at the right. The main tunnel on the railroad line, near the scene in the photograph, is nine miles long.

horn, in the Pennine range, is a high pass known as the Matterjoch or Théodule. At the summit of this pass is a little inn where Dr. Jordan and Mrs. Jordan, with a number of American student friends, were forced to remain for three days in August, 1890. A violent storm came on soon after they reached the place and practically buried it in snow. The sleeping quarters unfortunately did not connect with the dining room. Each morning the guides had to dig deep passageways in the snow to make it possible for the people to get to food and a fire. During the third night the storm ceased. When day broke, with the sun shining out of a cloudless sky, the scene was magnificently beautiful; but to understand *how* beautiful, you must know the Alps yourself.



*Ewing Galloway*

The Simplon Pass, one of the gateways between Switzerland and Italy. The photograph shows a narrow rocky gorge near the Italian end of the pass.

At one time or another Dr. Jordan has walked over most of the passes of Switzerland. The Alphubel, which passes over the ridge between the Dom and Monte Rosa, he has crossed twice, enjoying the noble view it gives of all the peaks of the Pennine range. He has also been over the Simplon, the St. Gotthard, the Splügen, and Maloja, all of which now have good roads; and he has been over a number of others where no roads are possible.

One of the most interesting passes of Switzerland is the Gries, which lies between two lofty peaks at the eastern end of the Pennine range, and runs from a bleak and cold valley on the Swiss side across the border into Italy. There it descends rapidly through a series of valley steps — each a little tract of level meadow followed by an abrupt fall, then

another grass-carpeted pasture and another fall, until one reaches the bottom. Part way down the Gries Pass, above the timber line, is the highest and finest waterfall of the Alps, the beautiful Tosa Fall, four hundred and seventy feet high, which plunges in three leaps from one level to another.

#### GREAT ST. BERNARD

The pass leading from Martigny-Ville, in the Swiss canton of Valais, to Aosta, Italy, is the most famed of all passes of the Alps. This is called the Great St. Bernard, and is celebrated not so much because of its scenery as for a hospice — house of shelter — which for almost a thousand years has been kept open in this high mountain pass by a community of monks.

The hospice of St. Bernard stands on the bank of an icy lake at the summit of the pass. It is a refuge for men of every class and country, no matter what their faith or condition in life, where food and a bed are furnished without price to all who cannot pay. In this wild cleft of the Alps, where even in summer the winds may be dense with snow, there is much need of a shelter, for many peasants and workmen who go from Italy into Switzerland and Germany to labor must come this way. It is the only route they can afford, because it is the shortest way through the mountains, and the long railway rides of the St. Gotthard and Simplon would use up their scanty earnings. And if they go back to their homes in Italy, they must trust their lives to the storms and take the path that leads by the hospice.

Day after day they come by, in almost all seasons, and day after day the monks feed and shelter them, and speed them toward their homes or their work — the monks and the dogs, for the dogs of the Great St. Bernard have been serving humanity through the centuries as devotedly as their masters.

The dogs meet you as you approach the big gray stone

building. They are shaggy, white and yellow creatures with the deepest of bass voices, neither so large nor so well kept as the St. Bernard dogs we all know, but they have the same great head, large feet and legs, and the same intelligent eyes. Thousands of lives have been saved by them, for they go out over the snow to look for travelers who have lost their way in storms or have been overcome by the cold, and help get them to the shelter of the hospice.

Some years ago Dr. Jordan found at the hospice a little volume written in French, in which one of the monks had told the story of the founding of the mountain retreat which for many centuries has been a place of refuge to all travelers passing that way. This is how it happened.

In the days of King Raoul, in the year 923, there was born



*Holmes, from Galloway*

The famous St. Bernard dogs in the hospice at the summit of the pass of the Great St. Bernard. These highly intelligent animals aid the monks in saving the lives of travelers and workmen who become lost in the snow.



in the Castle of Menthon, on the north bank of the Lake of Annecy in Savoy, a boy named Bernard de Menthon. His father was the Baron Richard, famous among the noblemen of the time, while his mother, the Lady Bernoline, was illustrious throughout the countryside for her graces and virtues.

Bernard grew up bright and beautiful, and his father was proud of him. He sent him to a school in France, which had been founded by Charlemagne a century before, and there the boy became versed in the best wisdom of his day. But his thoughts ran on the misery of humanity, and he wished with all his heart he might do something to lessen human suffering.

Several years passed. Bernard's course at the school was completed. His father chose a wife for him from among the highborn girls of his country, and bade him prepare for the career of a great nobleman. But Bernard had neither love for the maiden nor desire for the useless, idle, luxurious life that was lived by men of rank in those days. There seemed no escape from that fate, however. The wedding day was set, and with his father and mother he repaired to the castle of Miolans, where lived the bride who had been selected for him.

The night before the wedding came and the guests arrived. Every gate and door was guarded by armed retainers, making it impossible for one to go either in or out without being discovered. Bernard retired to his room and prayed God to show him a way of escaping this marriage for which he had no heart.

Then, the story says, he went to bed and to sleep, and while he slept St. Nicholas appeared before him in a dream, bidding him leave the castle at once and go to Aosta, where he would find a great work to do. When Bernard opened his eyes, the vision was gone, but the message it had brought him now became his great resolve.



Writing a note to his parents, that they might know the course he had chosen, Bernard leaped from the window, which was high up in the tower — a dangerous plunge for anyone. But he landed on his feet unharmed and hurried over the mountains down to the city of Aosta, at the foot of the Alps below the Matterhorn. There he entered the service of the church, became a monk and lived in the simplest way, striving always to give help wherever it was needed.

His fame as a preacher spread far and wide, for he traveled up and down the country speaking words of comfort to the poor. "From the mountains of Savoy even to Milan and Turin and to the Lake of Geneva," says the old chronicle, "his memory was dear." Even after he became archdeacon of Aosta, he still lived in the same humble way, caring nothing whatever for the luxuries of life, and seeking only to benefit his fellow men.

It happened in those days that the high Alps were filled with freebooters or robbers who practiced their heathen rites in the mountain passes.

In one of these passes above Aosta the god Pen had long ago been worshiped — (the word *pen* means the highest). Later, Julius Cæsar conquered the wild tribes there and forced upon them the religion of the Roman Empire. A statue of Jupiter replaced the old idol, Pen. Afterwards, by way of compromise, the Romans permitted the two to become one, so the people worshiped Jupiter Pen, "the great god of the highest mountains." A statue of Jupiter Pen was erected by the side of the lake in the pass now known as the Great St. Bernard, and the mountains then took the name of Pennine Alps, which they bear to this day. The pass itself was called Mons Jovis, the Mountain of Jove (another name for Jupiter). Through it have marched the armies of every nation and heroes of every age, from St. Peter, who according to legend came over



*Holmes, from Galloway*

Statue of St. Bernard standing on a bleak height of the pass where centuries ago he founded a place of refuge for those who crossed the mountains. There his followers still continue his brave work.

in the year 57 A.D., down to Napoleon, who passed eighteen centuries later on a much less worthy errand — the conquest of Italy. And through it today go toilers to and from their labor, and travelers from the four corners of the world.

While Bernard was preaching at Aosta, ten French travelers crossing the Mons Jovis were attacked by robbers, who captured one of them. The nine who escaped returned to Aosta, and when Bernard heard what had happened he offered to go back with them. He would dare the evil powers of the mountain, he said, rescue the captured man, and place the standard of the Cross over the altar of the heathen god.

He did as he said he would do. He pushed up into the lofty pass, and by his fearlessness and eloquence introduced Christianity among the heathen dwellers there. Then he founded a hospice as a place of refuge for all who needed shelter from the storms.

After Bernard died, because of his good works he was canonized, which means that the church placed him among the saints. Mons Jovis became St. Bernard in memory of him, and so it remains to this day.

That was almost a thousand years ago. Through all the centuries that have passed since then the work of mercy at the hospice has been carried on by simple, kindly men who give their lives to it, who try to follow in the footsteps of the great founder. Here travelers, princes and peasants alike, are served with plain food. For one night only all persons who come are welcome. The next day each one, unless sick or crippled, must pass on. Unfortunates, however, are allowed to remain, and the monks care for them until they are able to go.

### III. THE CHRISTMAS TREE LAND OF EUROPE

Along the eastern border of the north central part of Switzerland, between the canton of St. Gallen and the Austrian province of Vorarlberg, is Liechtenstein, known as the "Christmas tree land of Europe," because the principal occupation of the people living there is growing and shipping fir trees that gladden the eyes of children when the greatest of holidays comes. It is a beautiful narrow strip along the Rhine, with forests of fir, among the finest to be found in Europe.

Liechtenstein is one of the four smallest countries in the world, so tiny it would make just a corner in most of the counties of the United States. Its chief city has a population of about fourteen hundred people. Yet it is an independent nation, governed by the Prince of Liechtenstein

and a little parliament, and it has a better government than that which has ruled over many larger nations.

Even though Liechtenstein is in the business of shipping Christmas trees, the people do not destroy the groves, as has been done in so many other parts of the world. Whenever a tree is cut down, another is planted in its place and left undisturbed until seven years old. Then it goes to be trimmed up for somebody's Christmas festival, and another sapling is set in the ground in its stead. Each plot of timber land intended for harvesting is divided into seven sections, one of which is cut each year. With this excellent arrangement there is always a supply of trees for the holiday trade, and little danger of the land being denuded of forests.

#### IV. THE JURA MOUNTAINS

The Jura Mountains lie along the northern part of the border between Switzerland and France. They are younger than the Alps, and lower, none of them having an elevation of more than five thousand feet.

The Juras abound in charming scenery. Numerous villages and towns are tucked away in the shaded valleys, and they have a quiet beauty, very different from the grandeur of the high Swiss ranges. The Jura slopes are covered with forests of pine, larch, and fir. Along them one frequently sees mines, as there is coal in these mountains and some other mineral wealth. This range forms a watershed between streams flowing west into France and south and east into Switzerland.

As mountains, the Juras are not very impressive, but they are intensely interesting to the geologist. They abound in granite slabs and boulders deposited by ancient glaciers, which also helped to make numerous tarns and little lakes.

The Juras are extremely rich in fossils — among them petrified remains of reptiles that inhabited this region during

very ancient times. So many bones of creatures of the Mesozoic Age, in which the mighty reptiles lived, have been found here that the earliest period in that age is known as the Jurassic.

## V. THE GREAT GLACIERS OF EUROPE

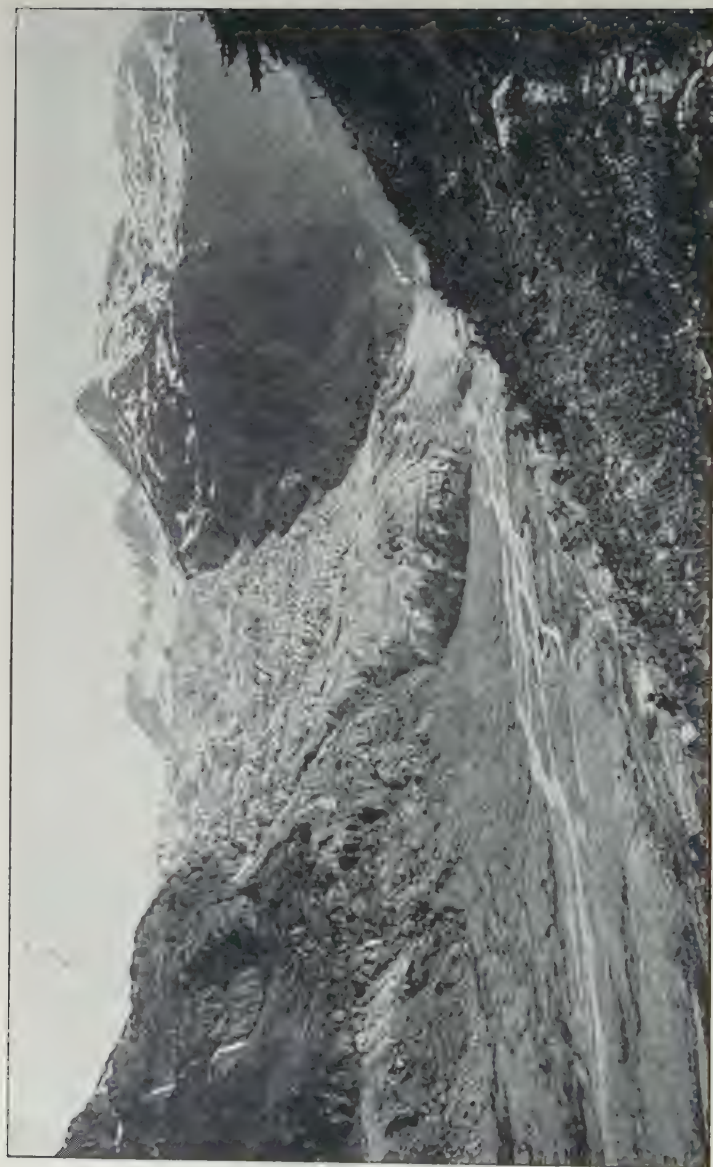
Although glaciers no longer extend down into the lowlands, as they did in the days when the wandering boulders were being deposited in the valleys of Switzerland and France, there are many of these slow-moving ice streams in the high Alps. The largest is the Great Aletsch Glacier, which comes down from the Aletschhorn in the eastern Bernese Alps.

The most widely known of the glaciers of Switzerland is that of the Rhone, the source of the great river that waters eastern and southern France. In ancient times people did not know where the Rhone came from, so they said it flowed out of the fountains of the night. But today we know it is formed by the ice mass that fills the upper part of the Rhone Valley. Although the Rhone Glacier is now only six miles long and is steadily becoming shorter, Agassiz found that there was a time when it reached far down into the lowlands, depositing boulders well into eastern France, even beyond Lyon.

In the heart of the Bernese Oberland are the great glaciers of the Finsteraar and the Lauteraar. They unite to form the Unteraar Glacier, for in one respect glaciers are just like rivers. Small ones flow into larger ones as tributaries, or join and move along in one body, just as streams of water do.

The melting snows of these Swiss glaciers form the turbulent river Aar, the largest stream of the Bernese Oberland. The Aar flows through the lakes of Brienz and Thun, and then northward until it joins the Rhine. Thus, feeding the Rhone and the Rhine, part of the water from the Oberland





*Facing Garmisch*

The Rhone Glacier, source of one of the great rivers of Europe. The white mass in the center of the picture is the lower end of the glacier. Torrents of water from the melting ice flow through this valley between the high Alpine ranges and, gathering in many other mountain streams, become the Rhone River.

flows at last into the Mediterranean, and part finds its way to the North Sea.

From the village of Zermatt, near the foot of the Matterhorn, more great glaciers can be reached than from any other place in Europe. They come down from the base of the Matterhorn, from the Weisshorn, the Dom, Monte Rosa, and other peaks that tower above this region and form a sort of horseshoe curve around the deep valley in which the village lies.

Moving down toward the valley of Chamonix is the Mer de Glace — Sea of Ice — a vast frozen river that comes from the snow fields on the north side of the Mont Blanc group. On either side descend the Glacier des Bossons and the Glacier d'Argentière, coming down from the Aiguilles, the needle-like summits which flank the great mountain. There are other smaller ice streams, too, all within a few hours' walk of the valley. On the south side of Mont Blanc glaciers descend the Allée Blanche, above the town of Courmayeur, from which outlook the mountain has been compared to a huge artichoke surrounded by its leaves.

The Alpine region is not the only glacier district in Europe. Very large ice rivers are to be found in Norway, where frozen streams flow from the snow fields of the Dovrefjeld. Some of these glaciers move down into the fjords, and the sight of the blue ice, flecked with white, breaking into the water as icebergs is wonderfully impressive. Shores such as these, where glaciers descend to the sea, have been called —

Nature's docks, from which she slips  
To the sea, her icy ships.

Norway has two great ice fields in which most of its glaciers arise. One of these, the Jostedal Bræ, is the most extensive in Europe. Another snow mass farther south, known as the Folgefonden, is the source of many glaciers, the majority of which descend short, steep slopes into the

fjords. All in all, from the vast frozen wastes of the Dovrefjeld more than a hundred rivers of ice come down.

## VI. AVALANCHES AND LANDSLIDES

Glaciers travel so slowly that there is no danger from them to people living in the country below. But sometimes in the mountains there are avalanches, masses of snow and loosened soil that plunge down very rapidly and destroy whatever happens to be in their way. Occasionally villages and many lives have been wiped out in this manner.

During the summer of 1883 Dr. Jordan was in the Bernese Oberland between the Wellhorn and Wetterhorn, just east of the Jungfrau. One day, as he and several others were passing through a pretty meadow covered with gentians and other Alpine flowers, they noticed a great mass of snow and ice sliding along on the level top of a very high perpendicular cliff barely a third of a mile away. Below, on a low ridge beyond a narrow valley, shepherds were blowing their horns with vigor, at each blast jarring off a considerable amount of the snow at the edge of the precipice.

Suddenly the whole white mass, covering perhaps a half acre and several hundred feet deep, slid over the cliff, falling a thousand feet with a great roar and filling up a considerable part of the little valley at its foot. For a distance of many rods away the heads of the flowers were cut off by the flying scraps of ice and piled up in wind rows.

In the high Alps in summer time one may often see small avalanches. The mountaineer is especially careful to avoid going into places where these masses are likely to fall, because to do so means to risk his life. It happened that the avalanche Dr. Jordan watched did no damage, except to the flowers and the meadow itself, and the sight was very impressive. Usually, however, these plunging masses are so terrible that people hold them in constant dread. As a very slight disturbance of the air may start an avalanche,

the guides sometimes forbid a group of people even to speak as they pass a treacherous stretch of snow.

Occasionally on the slopes of mountains landslides occur, sometimes carrying with them a prodigious amount of rock. In 1890 after a great landslide Dr. Jordan visited the town of Elm, in the canton of Glarus in eastern Switzerland. The descending mass had covered the whole west side of the town, burying houses and people deep in broken rock and mud. For a time it blocked the stream which flows through Elm, causing it immediately to rise, and threatening to submerge those who had not been caught by the slide. By the time Dr. Jordan arrived, the water had been drained off, and some work had been done toward excavating the buried region.

Another remarkable landslide once took place in the Maloja Valley, in the canton of Ticino, burying many houses near the Italian border. Plants and shrubs are now growing over a mass of rock which covered all one part of the town except the spire of a church.

When avalanches dam up rivers, they may cause destructive floods. About a hundred years ago, in the valley of Bagnes above Lake Geneva, there was great loss of life and property when a fall of ice and snow blocked the river and turned the portion of the stream above the dam into a lake.

## CHAPTER FIVE

### THE UPLANDS OF CENTRAL AND SOUTHERN EUROPE

#### I. THE MOUNTAINS OF FRANCE

##### THE ALPS OF DAUPHINÉ

IN southeastern France, west of the Italian boundary, besides Mont Blanc and its Aiguilles there are other mountains almost equally majestic. These are the Dauphiné Alps, a glorious range broken by numerous valleys and passes, abounding in brooks and waterfalls, and with many glaciers among their craggy peaks. They are a part of the same great system as the Alps of Switzerland, but are not nearly so well known, although easily accessible to the traveler. From the summit of Les Écrins, an ice-scarred peak more than thirteen thousand feet high, loftiest of the Dauphiné range, can be seen forty-two glaciers, twelve valleys, and more than a hundred and thirty peaks that reach an altitude of over ten thousand feet. On a clear day one can look far across into Switzerland, to the Matterhorn and Monte Rosa.

The pride of the Alps of Dauphiné is a mountain called the Meije, really three peaks in one, a huge rock rampart, so wild and forbidding that it rivals the Matterhorn in difficulty of ascent, and was not conquered until twelve years after the Whymper party reached the summit of the giant of the Pennine range. Then a Frenchman, de Castelnau, and two guides went to the top. Since that time many parties have scaled it, because it offers a view as inspiring as any to be obtained in Europe.

La Grande Ruine is another superb group of crags in the Dauphiné range. Over twelve thousand three hundred feet it towers, being almost as high as the Meije, and its summit is snow-covered throughout the entire year, except



on the black projecting pinnacles. It was named La Grande Ruine because from a distance it looks like a castle of crumbling walls and towers.

Among the Alps of Dauphiné are various Aiguilles, like those in the vicinity of Mont Blanc. At their bases are several delightful valleys, the most noted being the valley of the Romanche, through which a river has cut deep gorges. It is surrounded by magnificent mountains. At its head lies the Lac de l'Etoile — Lake of the Star — which is fed by a great glacier, and out of this lake a stream flows. Numerous other glaciers within easy walking distance of Val Romanche come down from the snow-capped peaks, feeding sparkling brooks and cascades and giving a wealth of beauty to this Alpine basin.

#### THE MARITIME ALPS

The Maritime Alps lie along the border between France and Italy, and, like those of Dauphiné, belong to the same great system as the ranges of Switzerland. They are not so high as the Dauphiné Alps, although several of their summits reach an altitude of ten thousand feet.

In the south the Maritime Alps come close to the sea. That is why they have their name, for *maritime* means pertaining to the sea. This region along the Mediterranean is known as the Riviera, from the Italian word *riva*, meaning bank or shore. Because of its delightfully balmy climate it is much frequented by those who flee the cold, wet winters of the north. The part of the Riviera which lies to the east of Genoa is known as Riviera di Levante — Coast of the Rising Sun — while that to the west between Genoa and Nice is Riviera di Ponente — Coast of the Setting Sun.

Many beautiful towns dot the Riviera, the most noted being Monte Carlo, famous — or infamous — through having the greatest gambling houses in the world, where people



*Frank Gallaway*

On the French Riviera, near the boundary line between France and Italy. Living sheltered between the Maritime Alps and the vivid blue waters of the Mediterranean, Mentone (in the picture) and the other coast towns are famous for their mild climate, gorgeous flowers, and beautiful scenery.

of all races try to mend their fortunes, and often end by losing what they brought with them. But Monte Carlo is visited by many who do not want to gamble, who are drawn there by the beauty of the place. It is charmingly situated on a sheltered bay, and handsome buildings, gardens, and cliffs overhanging the sea make it one of the loveliest towns imaginable.

On the Riviera di Ponente, on a projecting, rocky promontory below Monte Carlo, is the picturesque town of Monaco, as beautifully located as a town can be. With Monte Carlo, Monaco comprises one of the smallest countries in the world, the Principality of Monaco, considerably smaller than Liechtenstein, hardly more than half as large as some American townships, but an independent realm ruled by a prince.

In the museum at Monaco may be seen a wonderful collection of fishes and other marine animals. These were brought from the eastern tropical Atlantic by Prince Albert I, a nobleman interested alike in science and in world peace. In his steam yachts, *Princess Alice I* and *II*, and *Hirondelle I* and *II*, he scoured the Mediterranean and Atlantic studying the sea life, and brought back to Monaco a matchless lot of specimens. He has, indeed, a permanent place in the history of science.

On the cliffs above Monte Carlo, and well back from the shore, stands an old Roman town with a high watch tower. This is known now as Turbie, but the ancients called it Turbia. Just below and beyond this town, seeming as though it were itself a part of the bony structure of the mountains, is an ancient hamlet called Èze (formerly Esa), which overlooks a long peninsula. In a curve of this peninsula is the bay of Villafranche, one of the most gracefully shaped and vividly blue sea arms in the world, of which an American, F. J. Clarke, once wrote :

Where black warships ride at anchor in the Bay of Villa Franca,  
Eagle-like, gray Esa, clinging, from her rocky wall looks down;  
While above the mountain dim, ruined, shattered, stern and grim,  
Turbia sees us through the ages with her austere Roman frown.

One of the charms of the south of Europe is that here the ancient and modern worlds seem to meet. From the midst of the civilization of today, from hotels and residences equipped with conveniences of the twentieth century, from streets where people in the gayest apparel stroll along or dash by in high-powered automobiles, one can look upon remains of the life of centuries ago, when Roman nobles in gorgeously colored tunics drove their chariots on the same cliffs beside the same blue sea.

Other famous towns on the Riviera are San Remo, Mentone, and Nice, all blessed with an ideal climate and beauty of mountain and sea.

From Nice east to Turbie and Monte Carlo, along the outskirts of the Maritime Alps, extends one of the finest roads in Europe, La Grande Corniche — the Grand Cornice. West from Nice to Fréjus, over the red cliffs and under the pines of the low mountains called the Estérel, runs the Corniche d'Or, or Golden Cornice, so called because of the bright red soil of the Estérel, the most colorful of all the Maritime Alps.

#### THE CÉVENNES, AUVERGNE, AND VOSGES MOUNTAINS

Due west of the Maritime Alps are the Cévennes, a range of low mountains extending from north to south in France, forming a watershed from which streams flow into the Loire, the Garonne, and the Rhone. There are forests of cork oak in Cévennes, and the chief business of the people there is gathering and shipping the bark that becomes the cork of commerce.

To the northward of the Cévennes, in south-central France, are the low, bony Auvergne Mountains, ridges with

*American Nature Assn.*

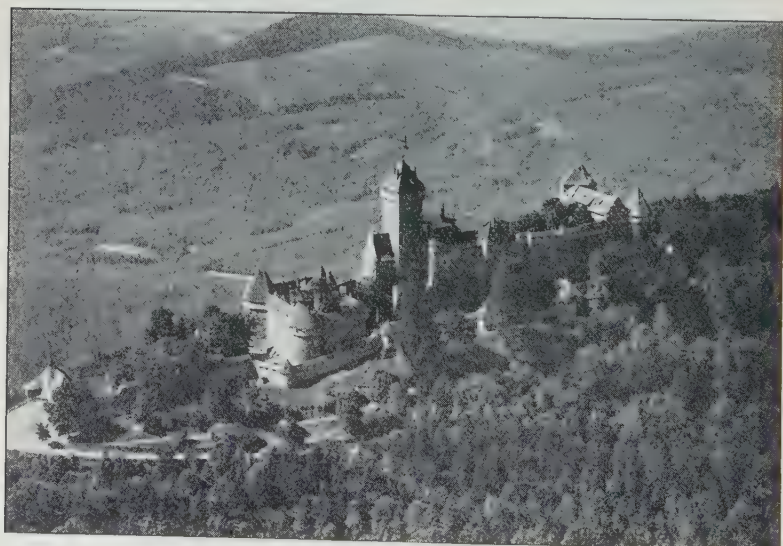
Removing bark from a cork tree. The slabs of cork are an inch or two thick. The bark is stripped first when the tree is about twenty years old and every nine years afterward.

no high peaks and very different in structure from the other mountains of France. They are composed entirely of lava and still show many evidences of volcanic action that storms and time have not yet worn away. Of the lava formations of Auvergne, called Repos de l'Aigle, and the Grottes de Jonas, in which the people of that region made their homes during ages past, we have already spoken. Around these, in every direction, are half-obliterated craters torn by old eruptions.



The Vosges Mountains lie near the border between France and Germany, and form the western boundary of the basin of the Rhine. The highest summits do not exceed five thousand feet, but on the east the slopes are often steep, and they are seamed with ravines which give them a wildness not common among low ranges. Up to a height of about thirty-six hundred feet they are covered with forests of beech and pine, which furnish timber for the manufacture of toys and various wooden articles, one of the chief industries of the peasants who live among them.

The Vosges Mountains are in the provinces of Alsace and Lorraine, the "Lost Provinces of France," as they were long called. At the time of the Franco-Prussian War, 1870-71, they were part of France, but by the treaty of Frankfurt, which followed the war, they were ceded to Germany. In 1919, however, by the treaty that closed the



Airplane view of an ancient château in the French province of Alsace, overlooking the wooded foothills of the Vosges above the Rhine Valley.

*Aerofilms, Ltd.*

World War, they were restored to France. Lorraine is especially rich in iron, and Alsace is one of the most thrifty regions in Europe.

## II. THE MOUNTAINS OF AUSTRIA AND GERMANY

### THE TYROLEAN ALPS

The Alps overflow across the Swiss border into Germany and Austria as well as into Italy and France, and give to those lands some noble scenery.

The highest mountains of Austria are the Tyrolean Alps, which lie chiefly in the province of Tyrol and extend across the border into Italy. They are an extension of the Bernina range of Switzerland, which borders the Engadine, and are very rugged, being broken by wild gorges and deeply fissured cliffs. In the fertile lower valleys, where the climate is mild, there are vineyards and orchards.

Among the Tyrolean Alps are several notable towns, the largest being Innsbruck, on the river Inn, a stream that drains the Engadine. One of the interesting sights of Innsbruck is the monument of the national hero, Andreas Hofer, whose name means as much to the Tyrolese as that of William Tell means to the Swiss. He was a fearless patriot who led his countrymen in a struggle to obtain freedom from the German land of Bavaria, and gave his life in the cause of liberty. Napoleon aided the Bavarians, and Hofer, at the head of his tiny band of mountaineers, made a brave stand against the combined forces of Bavaria and France. But he was captured and taken a prisoner to Mantua, Italy, where he was shot as a traitor, because he had fought for the freedom of his own country.

The chief towns of South Tyrol, now a part of Italy and known as the Trentino, are Bozen and Meran (in Italian, Bolzano and Merano). Bozen is situated at the foot of a mountain on the banks of a pleasant stream, and is a place of



*Donald McLeish*

A scene in the Italian Tyrol. On high Alpine pastures the goats find sunny patches for grazing.

luxuriant orchards and vineyards and stately old castles. Some of these ancient structures are now crumbling ruins; some have been restored, and they give a real picturesqueness to the town. Because of its sunny and dry climate, Meran is much frequented as a winter resort. The grape festival in

the autumn is the great event of the year and draws many people from all the neighboring lands.

In Meran, too, there is a tablet to the Tyrolese patriot, Andreas Hofer, for in this town he was tried before being taken to Mantua. He was born just a few miles away, in a little valley called Passerthal, and there he lived his life as a country innkeeper until Bavaria began to tyrannize over the Tyrol, and he led his companions in the fight to set her free.

Bozen was the birthplace and early home of one of the most delightful characters of history, Walther von der Vogelweide — Walter of the Bird Meadow — a man who for a long time was believed to talk with the birds. He was a poet — a minnesinger, as poets of that land and day were called — and during his early manhood wandered over a large part of central Europe lilting his songs. He loved birds so much, and spent so many hours whistling to them and listening to their trilling, that people came to believe they understood each other. Once when somebody asked him who taught him to make such beautiful verses he said, "For a while I studied with Reinmar in Vienna, but most of all I learned from the birds." Nobody doubted the truth of what he said, because all over that region it was believed that he and the birds carried on real conversations.

When Walther von der Vogelweide died, he asked that he be buried in a spot open to the sun, so that the feathered creatures might sing upon his grave, as they had sung so often to him during his lifetime. He left a sum of money to be used in providing food and water for them. Long-fellow, upon visiting the place where he sleeps, wrote these lines :

But around the vast cathedral,  
By sweet echoes multiplied,  
Still the birds repeat the legend,  
And the name of Vogelweid.



Now, in the town of Bozen, there is a public square named in honor of Walther von der Vogelweide. It is called the Waltherplatz, and stands as a monument to the minnesinger.

#### THE BAVARIAN ALPS

The highest mountains of Germany are the Bavarian Alps. These lie in the southern part of the country, running toward Switzerland. In the heart of the Bavarian Alps, shut off from the highways of travel by great walls of rock, lies the valley of a little river called the Ammer. On the banks of this upland stream is a village known as Oberammergau, in appearance no different from any one of a hundred others in Germany, Austria, and Switzerland, but famous the world over, because of a drama given there once every ten years that is called the Passion Play.

The Passion Play is not an exhibition put on for the amusement of the people. It is a deeply religious observance, an expression of gratitude to God on the part of the peasants, and it had its beginning in the following way.

Almost three centuries ago a plague called the Black Death swept over Oberammergau, and a tenth of the inhabitants died. The others made a vow that if God would stay the terrible disease, they would, every tenth year, repeat in full the tragedy of the Passion, or the crucifixion of Christ. When this vow was made, the pestilence ceased, and not another person perished. From that time until the outbreak of the World War, each tenth year for nearly three centuries, almost ever since the Pilgrims landed on Plymouth Rock, the Passion Play has been given at Oberammergau.

At first only peasants came to see and to join in the observance, village folk of Bavaria, Württemberg, and the Tyrol, on horses, on donkeys, and on foot, across mountain walls and through dense forests. About fifty years ago the



world beyond the mountains heard about this religious drama, and since then a stream of travel has turned toward the Ammer Valley. Prince and peasant among these tourist folk are treated alike by the simple, honest people, and the same preparation is made for the reception of all.

The actors in the Passion Play are the Oberammergau peasants themselves, and they must lead righteous lives in order to be permitted to take part. Above everything else, they strive to enact truthfully the parts they portray. To play the part of Christ, or of Mary or St. John, is the highest honor that can come to a citizen of Oberammergau, and from childhood boys and girls try to live so worthily that they will be chosen for one of these great characters. The thought of being worthy of participating in the Passion Play keeps the people of this Bavarian mountain village pure in heart and humble in spirit. To them the noblest thing in life is to have a part in the sacred drama.

#### THE HARZ MOUNTAINS

In the central part of Germany is a group of mountains known as the Harz, which, although not high, abounds in rugged scenery. The highest peak is the Brocken, which rises above a lofty plateau to a height of about four thousand feet. The lower slopes are wooded, but the crest is bare of trees, and on it has been built a tower that commands an extensive view of the surrounding country.

Around the Brocken tower are blocks of granite, grotesquely shaped through the wear of frost and wind, but believed by the peasants to have been placed there by supernatural creatures. One of these is called the Devil's Pulpit. Another is the Witches' Altar, and the others have names equally suggestive of the belief of the people concerning them. One of the stories told by those who live in that region is that on Walpurgis Night — the last of April — witches ride on broomsticks, goats, and all sorts of queer

mounts, and hold high festival on the summit of the Brocken. They say the devil meets the infernal ones there and leads the ceremonial, and no amount of money will persuade a peasant to venture up the mountain on that night, for while the Brocken is believed to be a place of danger at all times, especially is it dreaded on Walpurgis Night.

Another thing that makes the peasants of the Harz country fear the Brocken is a peculiar sight they sometimes behold when the summit is unclouded and the sun is on one side, while mists rise on the other. When this happens, the shadows of the mountain and objects upon it are cast on a wall of fog. Not understanding the reason for this phenomenon, the simple folk think it one more sign that the mountain is the haunt of witches.

#### THE CARPATHIANS

Extending eastward along the boundary between Poland and Czecho-Slovakia, and then south and southwest through Rumania in a huge arc, are the Carpathians, granite masses like the Alps. Their slopes are much scarred by glaciers, although there is little ice among them now.

From the Carpathians streams flow to the Oder and the Vistula rivers and then onward to the Baltic Sea, while other streams from these mountains flow to the Dniester and the Danube, which send their waters to the Black Sea. Scattered among these ranges are many small but beautiful lakes, more than a hundred in all, which the Hungarians call "eyes of the sea." Some of these lakes lie on bare slopes and crests; and some are in the depths of forests, dense, far-extending groves of chestnut, beech, and fir, that deck the lower slopes. Bears, wolves, and lynxes lurk here, and in every way the Carpathians are a wild region.

The highest part of the Carpathians is the Tatra, where huge granite masses tower above the valleys like a gigantic

wall. With the exception of about a month in midsummer, the highest peaks are always white-crested, and in some of the gorges on the north side the snow never melts.

"Wild Tatra land," wrote a Hungarian poet two hundred years ago, "where echo-haunted valleys shelter prowling beasts, and nature spreadeth ermine rugs above the fir and pine trees."

### III. THE MOUNTAINS OF JUGO-SLAVIA, ALBANIA, GREECE, AND RUSSIA

In the southwestern part of Jugo-Slavia begins a long range of limestone mountains that extends through Albania and Greece. Most of them are well rounded, although in many places on the western side they are steep and precipitous. Following the outline of the coast, these mountains trend southward to the tips of the Greek peninsula. On the seaward side there are short, fertile valleys, but at the base of the slopes on the eastern side the soil is dry and poor, and here the peasant has a hard time to make a living, even at raising goats, which thrive where most other animals cannot exist.

Along the border between Dalmatia and Bosnia, and within Albania, the mountains are higher and barren. On the Albanian frontier is a range called Prokletia — Accursed. (It would be well to study the map on page 31.)

Albania, lying between Montenegro and Greece, is occupied by vigorous, uneducated people. In natural features, it is a sort of little Switzerland. It has craggy heights and swift streams with rapids and waterfalls. Its surface, however, was never swept by glaciers, which round down angles and mix the soil of the valleys. With the people, it is much the same; their inaccessible crags have shut them off from the rest of the world. Their relations with one another are simple and elemental. Kindly and hospitable, they are



*Long call day*  
A mountain road in the Dalmatian province of Jugo-Slavia. This region is nearly all mountainous and only small patches of land can be used for farming or sheep raising. The limestone mountains are honeycombed with caves and natural tunnels, and the streams disappear underground. Consequently the surface soil is too dry to support much vegetation.

yet quick to anger and quick to use the rifle. As in other primitive regions, blood feuds are common, and each clan may have a score to settle with some other.

Greece as a whole is a stony mountainous region, with scanty rivers which mostly run dry in summer. On the banks of the streams and on their rocky islands grows the crimson oleander, a characteristic flower of the land. With its vivid clumps of blossoms lasting the entire summer, set against a background of laurel and myrtle, it enlivens the landscape. The oleander figures in the songs and stories of Greece from the earliest times.

Far in the south Greece ends in Sparta — “five-fingered Sparta,” as poets of old called it — its promontories thrusting themselves like fingers into the Mediterranean. Sparta was a warlike and dominant community during ancient times, although not very large even then. With the surrounding country, it formed an independent state, governed by the harshest of laws, called the Code of Lycurgus. Military success was the sole aim. No other state ever put up so narrow and selfish an ideal. In the art and culture of Greece Sparta did not share.

The Spartans had a brutal way of fostering national strength. They set about making the children strong by exposing them to all sorts of hardships — cold, hunger, and exertion that only the most rugged could stand. Shortly after birth, each baby was brought to “the elders,” who decided whether or not it was to be reared. Weak ones were put out in wild places. If they survived the exposure, well and good. If they died as a result of the hardship, it was considered better for the state than to let them grow up into weak men and women.

Sparta, once a force in the ancient world, is now scantily occupied by people, few (if any) of whom are descended from the original stock. Its power declined, like that of Athens, on account of the numerous wars, external and internal,



which wrecked so many Greek cities. Its population, also, was driven out or destroyed in part by the malarial mosquito, which infests the ponds and swamps of this region, as it does those of the Roman Campagna and much of Macedonia.

In the eastern part of Greece, beautifully located in a cleft of the mountains, is the Vale of Tempe, from earliest times famed for its loveliness. Rising just beyond it is a noble peak almost ten thousand feet high, on whose summit the ancients believed their gods dwelt. This is the Mount Olympus of mythology, the place where Zeus, or Jupiter, king of gods and men, was supposed to assemble Neptune, Mars, Apollo, Minerva, Diana, and all the other immortals; and here, according to the old stories, wonderful feasts and revelings took place. There was wrangling and intrigue here too, because these deities had their disputes just as mortals do.

To the southeast of Olympus are the two lower mountains of Pelion and Ossa, which also figure in mythology. The Greeks used to imagine that the giants piled Pelion on Ossa in order to reach the abode of the gods on Olympus.

Southward from Mount Pelion, skirting the east coast of Greece, extend irregular, broken groups of bare, stony heights and crags, ending in the old state of Attica, with its renowned capital, Athens. Along the way lie the famous battlefields, Marathon and Thermopylæ, and the ancient, now ruined, city of Thebes.

Near the center of Athens rises the Acropolis, the lowest and at the same time the most famous of all Grecian heights. On this block of crystalline limestone stand the ruins of the Parthenon, a temple of exquisite beauty, the most perfect monument of ancient art. In literature, philosophy, sculpture — all the art and thinking of the time — the educated class of Athens led the world. In theories of life and training, the fine culture of the Athenians stands out in sharp contrast with the dull cruelty of Sparta.



*Ewing Galloway*

Mount Athos in Greece close to the Ægean Sea. The group of buildings is an ancient monastery.

Across from Mount Olympus, to the south of the ancient city of Saloniki (Thessalonica of Bible history), three gigantic peninsulas thrust themselves into the sea. These are Cassandra, Lougos, and Athos. Mount Athos, the tip of the easternmost peninsula, has the shape of a pyramid. Its white marble summit, visible at sunset from afar, rises to a height of over six thousand feet. This peninsula is remarkable for the beauty of its scenery, and for its several communities of monks, who belong to the Greek Church and still live under medieval conditions.

Some miles beyond Athos is another noted headland, Kavala, the city on its crest being the most impressive of all Ægean seaports. The high bluff on which the city perches is connected by a low isthmus with the long barren ridge behind. On this upland, about ten miles back, stood the ancient town of Philippi, where Antony and Octavius overthrew Brutus and Cassius. A superb Roman aqueduct

*R. H. Markham*

In the mountain regions of Bulgaria. The Rila Mountains are a majestic range, with peaks reaching a height of 7000 feet. The photograph shows Lake Stradlivo filling a broad valley.

still carries water across the isthmus to the center of the city. It seems strange that the Greeks and Romans, with all their building of waterworks, never hit upon the idea of pipe lines which would follow the surface up and down, but always depended on open stone aqueducts with an even slope from mountain spring to city fountain.

In the southwestern part of Bulgaria is a long range of ancient mountains known as Rhodopes — a delightful word meaning “rose view” — so named perhaps because of the rosy sunset tinges on their crests. Farther north, through the middle of Bulgaria, are the Balkan Mountains, old too, nearly all rounded from having been much worn down by storms, none very lofty, and separated occasionally by narrow passes. The Balkan Mountains have played an important part in the politics of Europe, and around them have centered many disputes.

There are no great mountains in Russia. Along the border between that country and Siberia is a long, low ridge made up of slate and granite, called the Ural. This is not a single range, but a broad plateau broken by many chains, none of which is more than six thousand feet high. On the lower slopes of the Ural, in the center, are vast forests of larch, fir, and spruce. In the north they are covered here and there with dwarf birch, and in the south these mountains are dry and barren.

Because of their mineral deposits, the Urals are among the richest mountains in the world. Gold, silver, lead, copper, zinc, and asbestos are found among them in considerable quantities. Ninety per cent of all the platinum in the world comes from these ranges.

#### IV. THE APENNINES AND THE DOLOMITES

The great mountains of Italy are the Apennines, trending down the length of the peninsula. They are composed largely of limestone, sandstone, and clay, instead of granite, which for the most part makes up the peaks of Switzerland. The Apennines have been a good deal eroded by water and wind. Browning called them "the wind-grieved Apennines," for wind as well as water helps to erode and tear away the soil. But they have not been touched by glacial ice, which never reached down into the Italian peninsula.

In the Apennines, to the east of Florence, is the tiny republic of San Marino. It is one of the smallest states in Europe, having an area of only thirty-eight square miles and a population of about twelve thousand. A council of sixty members and two officers, called captains-regent, constitute the governing body, and the people are so well satisfied with the system that they have no desire to become a part of any other nation.





*Holmes, from Galloway*  
San Marino, the capital of the smallest republic in the world, a picturesque town upon a high hill which looks down on a wide-spreading fertile valley.



Nowhere do the Apennines rise to any great height. The highest peak, Monte Corno, is less than ten thousand feet, and the other summits are considerably lower. But there are many beautiful valleys in this range, with forests of chestnut, oak, and maple cloaking the lower slopes, and above, the green of cedar, spruce, and larch.

Toward the south, in the vicinity of Naples, there is a large district of the Apennines under which volcanic forces are still at work. Vesuvius is the center of this volcanic district, which extends on south through the toe of "the boot of Italy," and across to Sicily, where Etna lifts its huge, broad lava cone.

Because their slopes have never been dug out by glaciers, the Apennines are not dotted with lakes, like the uplands of Switzerland and northern Europe. Neither have they so many streams and waterfalls. But they are among the most storied heights in the world. Through their valleys and along their slopes marched the forces of the Cæsars. Across them swept also the Vandals, the Ostrogoths, and other tribes who surged down from the north in an effort to possess southern Europe. Just to name a small fraction of the events that have happened in the Apennines would add many pages to this volume.

Near the border between Italy and the Tyrol are the Dolomites, a range of mountains that formerly were a part of Austria but now belong to Italy. They are widely celebrated for their picturesque rocks of dolomite, a white or yellowish mineral often stained with shades of red, somewhat like marble. This mineral was named in honor of the great French geologist, Dolomieu.

The Dolomites are broken by numerous passes and valleys, through which rivers make their way to the sea. They abound in bleak and precipitous cliffs, streaked by veins of vivid and startling color. The summits are rent by many fissures, which give them a most fantastic appearance, many

of the peaks ending in needle-like spires. In the morning and evening light they are indescribably beautiful, and to be at sunset time in the Dolomites, when rainbow hues lie upon the broken spires and cliffs, is like visiting some fairy world, so different are they in appearance from most other ranges.

Nestled among the Dolomite valleys are many villages and towns, one of which, Pieve di Cadore, on the river Piave, is noted for its numerous kinds of wild flowers. Here was born the great Italian painter, Titian, and there is a legend that here, when a child, he made his first picture on the stone wall of a house by using blossom petals for pigments.

The largest town in the Dolomites is Cortina, situated on the banks of a river and surrounded on all sides by strange-looking mountains. Cortina is often called "the Pearl of the Dolomites," and deserves the name, for with its chalet-like houses, its quaint church ornamented with wood carvings, its clear and icy-cold stream, and its encircling mountain wall, it is a gem of a village.

The people living in the Dolomite region are as picturesque as the country. A jaunty little green hat with a feather is the headgear of the men, and the women cover their abundant dark hair — when they choose not to go bare-headed — with a small square shawl upon which are printed bright-colored flowers and birds. As their skirts are usually red, green, or of some other bright hue, there is always a feast of color at Cortina.

Although the Dolomites are not so lofty as the highest peaks of the Alps, they are on the whole a high range, with Monte Marmolata rising nearly eleven thousand feet, and several other summits but little lower. Like the Matterhorn, with their fissured slopes and summits, they make the best use of their height. If they were dome-shaped, like Mont Blanc, they would not appear so high as they do with their needle-like spires.

*Ewing Galloway*

In the Dolomites of northern Italy, a region of mountains with extremely sharp peaks and slopes marked with startling colors. In the valleys are many quaint villages shut off from the outside world.

## V. THE PYRENEES

In ancient times the people of Gaul, as France was formerly called, believed the southern part of their country was the end of the world, because beyond it rose a wall of mountains so forbidding they thought only gods could surmount them, and therefore the celestial regions must lie beyond. The mountains forming this wall are the Pyrenees. They are abrupt and craggy, and almost unbroken by passes.

The most striking feature of the Pyrenees we have not elsewhere met in this story of European mountains. The upper end of nearly every valley on the French side shows an incurving semicircle in the vertical wall along the mountain front. This U-shaped section is called a cirque. Over the upper edge, in the middle of each cirque, plunges a mountain torrent which, during the ages, continues to cut farther and farther back into the rocky wall. These cascades, a sheer



A remarkable cleft in the rocky heights of the Pyrenees, at Gavarnie on the border between France and Spain. According to tradition, this is the famous Pass of Roland.

fall of water, are often very beautiful. The largest of them, that of the Cirque de Gavarnie, drops fifteen hundred feet from the brink of the plateau above to the valley floor. This is the upper stretch of the river Gave de Pau, which flows swiftly down the mountain slope and through the picturesque town of Lourdes. There is a famous and sacred grotto in Lourdes, where pilgrims come to worship, journeying from all over France and from far-distant lands.

Another notable feature of the Pyrenees is the total absence of lakes. This fact and the lack of passes — there



being only two suitable for roads in a length of two hundred miles — show that no glacier ever ground over those mountains.

The Pyrenees figure in many legends and stories of the Middle Ages. They too were “accursed mountains” to the peasants, who feared their unknown heights, and only daring spirits would venture to cross them. Charlemagne led his forces over them when he rode against the Saracens who had overrun Spain. Tradition says that in the defile of Roncevalles the knight Roland went to his death when the emperor’s rear guard was destroyed through the treachery of the Saracen leader, Marsilius. Above the town of Lourdes there is a slight opening across the range that to this day is called Pas de Roland — Pass of Roland — and old traditions say he cleft it with his sword in trying to escape from the enemy. A great poem of the Middle Ages, called *Chanson de Roland* or *Song of Roland*, tells the story of this knight, and it is filled with references to happenings in the Pyrenees.

Many of the inhabitants of the Pyrenees are shepherds, who when winter comes move down the slopes with their flocks, and in summer follow them to the high pastures. They are simple men whose lives are spent with the sheep, who know nothing whatever of the comfort of cities, and seem to be satisfied with existence in the mountain valleys. They are often fierce-looking men, because of their rough dress and unkempt beards and hair. But most of them are well-disposed, kindly fellows, who would risk their lives for the sheep intrusted to their care. The famous French painter, Rosa Bonheur, has pictured one of these upland herders in a canvas called “A Shepherd of the Pyrenees.”

In the heart of the Pyrenees is the little independent principality of Andorra. It consists of six villages or parishes, each one of which forms a department or commune. From each of these four councilors are elected,



making twenty-four for the entire republic, and these men draft the laws and see that they are carried out. Andorra contains about two hundred square miles and has a population of less than six thousand — not nearly so many as most counties in America. Oats and barley are raised, but the land is poor and not adapted for general farming.

At the eastern edge of the Pyrenees, about twenty-five miles northwest of the city of Barcelona, is Montserrat — serrated mountain — celebrated during the Middle Ages as the Castle of the Holy Grail. The story of the Grail is one of the great tales of all time and has been the inspiration of some of the world's noblest poetry and music. It tells that, when for the last time Jesus supped with His disciples, He drank from a golden cup called the Grail. After His death this vessel healed and gave comfort to all who touched it, until in some strange manner it disappeared. Men spent years and braved all sorts of dangers in trying to find it, but for a long, long time no one succeeded. Then, tradition says, it was discovered at Montserrat, or Montsalvat, as the place was called in those days; but only those whose lives were pure might have a glimpse of it.

Among the thousands who went up and down the world seeking the Holy Grail were Sir Galahad and other knights of the Round Table, companions of the high-souled King Arthur. A great poem of the Middle Ages called *Le Mort d'Arthur* is made up of the exploits of the heroes who sought the Grail. Tennyson, in his *Idylls of the King*, has told about some of these men and their wanderings.

Another who strove through years to find the sacred cup was Parsifal, who, after a long series of adventures, came finally to Montsalvat, only to learn that although the Grail was there, he could neither see nor touch it until he was pure in heart. The story of Parsifal, told in dramatic form, was set to music by Richard Wagner, in the opera of that name.

Montserrat is a mighty mass of slate rising above the plateau, and from a distance looks like a great castle. Along the top it is so broken, or serrated, that it resembles a vast crown. It is not surprising that during the far-off centuries when men knew almost nothing of the Pyrenees, it was easy for those who beheld it from afar to think it was a mysterious castle. The American writer, Charles Dudley Warner, once said of it, "Another mountain so airy, grotesque, and flame-like does not exist."

## CHAPTER SIX

### THE GREAT STREAMS OF EUROPE

#### I. THE VOLGA

THE largest river in Europe is the Volga, a mighty, winding stream that moves for almost twenty-four hundred miles across the plains of Russia. This great waterway rises in some small lakes among the hills northwest of Moscow, in the western part of Russia, and flows eastward and southward until it comes finally to the Caspian Sea. It gathers up a retinue of lesser rivers as it moves upon its way, and drains the greater part of eastern Russia.

As the Volga moves south, it crosses some vast plains known as steppes. These are prairies similar to those of the central part of the United States, and are treeless. But instead of being a prosperous farming region, as are the great plains of our country, they are largely a waste, inhabited by Tartars, a race of men who will not live in any one locality but wander from place to place just as the mood possesses them. The Tartars will not bother with farming or try to raise cattle, sheep, and goats. When they want animals for meat, they are likely to steal them from hard-working shepherds. The joy of life to these wild men consists in roving and fighting.

The Volga, like the Rhone, is a stream that is forever building. The sand and clay it carries from the plains are thrown back by the waves of the Caspian, and of these has been formed a delta that each year is extending farther into the sea. Today, along the mouth of the Volga there is land where a thousand years ago was blue bay, land formed by the sea and the river out of material carried down from the plains.

*Deutscher Aero Lloyd*

Airplane view at the mouth of the Düna, a stream that brings sand and clay from the great plains of Russia and builds up land on the shore of the Gulf of Riga, an arm of the Baltic. The black band across the middle of the picture is the Düna. The photograph was taken at low tide when the sand banks are exposed.

## II. THE DANUBE

Next to the Volga in size among the streams of Europe is the Danube, a river stately and winding that has its rise as a mountain stream in the Black Forest. Down through Germany it goes and across the border into Austria, flowing through a region of castles and romance.

The castle country of the Danube lies above Vienna, between that city and Linz. Here, on both sides of the river, are the ruins of ancient strongholds perched high up on the cliffs, strongholds that were for the most part the seats of rich robber barons of the Middle Ages, for the lords of the Danube Valley were no better than those of the Rhine.

*Ewing Galloway*

The Ringstrasse, Vienna, the famous street built on the ground where the ancient walls stood in the days when Austria's capital was a walled city. On the left are the Parliament Building and the Rathaus or City Hall.

A wealth of stories clings to each one of these ruined castles, but of all the tales that haunt the Danube banks the most romantic is that of Castle Dürnstein, a splendid old pile on a jagged rock forty miles west of Vienna. Here in 1192-93 Richard the Lion Heart, King of England, was kept a prisoner for fifteen months by Duke Leopold of Austria, and the account of how he became a captive illustrates the methods used by some of the old-time lords.

Richard was returning home from the crusades, and in the course of his wandering came to Dürnstein. Worn out from much traveling, he sought rest and shelter there, and Duke Leopold's castle keeper, very inappropriately named Engelhart (Angel Heart), decided that this homebound crusader would be a rich prize, for well he knew him to be the king of England. He opened the halls to Richard, set



before him royal fare, and summoned gypsies to play while he feasted. Finally the Lion Heart fell asleep. Then servants of the duke carried him up a winding stairway, and when he awoke he found himself a prisoner in the tower.

Fifteen months he stayed there, hidden away from the world by the walls of Dürnstein, and back in his realm of England no one knew what had become of him. Most of the people believed him dead, and his brother John, who had ruled during his absence, made ready to be crowned sovereign of the land.

But a faithful servant of King Richard, a minstrel named Blondel, would not give up the search. All over Europe he wandered, seeking the master he loved, and one day, in the course of his quest, came to Castle Dürnstein on the Danube. At an inn where he stopped for food he heard some peasant girls talking about a prisoner in the tower.

Prisoner! Could that be his master? He would go and find out.

Hurrying to the base of the cliff on which the castle stood, he began to sing a ballad Richard loved. Sweetly, plaintively he caroled, strumming his harp in accompaniment, and up in the tower the prisoner heard.

For a minute the Lion Heart thought he must be dreaming. But as he listened he recognized the voice of Blondel. He began to sing back to him — for he was a fine musician — and then the minstrel knew he had found his lord.

Blondel hurried back to England with the news. Without delay, money was raised for the payment of a ransom, which set King Richard free.

On its way to the southeast the Danube flows through Vienna, the ancient capital of Austria and one of the most beautiful cities on the face of the earth. It lies on the right bank of the river, surrounded by a broad girdle of woods and meadows, beyond which timbered hills extend in every direction.

For many centuries Vienna was the capital of an empire and the residence of kings, and so it contains some of the most splendid palaces in Europe. It is the seat of one of the great universities of the world.

There is a street in Vienna that is perhaps the most celebrated in Europe. The Ringstrasse it is called — Ring Street — because it forms an irregular circle. It covers the ground upon which the ancient walls stood in the days when this city, like all others of Europe, was protected by an inclosure of masonry, to keep out attacking armies which were likely to appear at almost any time. But since the Middle Ages the capital has grown in every direction, so that the street marking the line of these old walls now forms an irregular circle within it instead of being on the outside.

The Danube, after flowing east and southward from Vienna, goes through Budapest, the ancient capital of Hungary, a strikingly picturesque city, the old part of which stands on cliffs overlooking the river. Some of its buildings were erected centuries ago, and many of these, as well as numerous modern ones, are of the pattern of those of Turkey and the Far East. This old part is known as Buda. The modern commercial section, called Pesth or Pest, lies below Buda, on the opposite side of the Danube.

After leaving Budapest, the Danube flows across a broad plain and passes over the Hungarian border into Jugo-Slavia. Four considerable streams join it in its course through Jugo-Slavia, the Drave, the Tisza, the Save, and the Morava, each of which traverses far-extending lowlands. It moves past Belgrade, the capital of Jugo-Slavia, in whose streets one sees a motley crowd of peasants in quaint, vivid costumes, rich folk decked in the fashions of Paris, and gypsies from the hills.

All over Hungary, Jugo-Slavia, and the Balkans numerous gypsies are to be seen. They flock down from the high

country to the fairs that are held each year in the towns along the lower Danube, and there they sing, dance, fiddle, and tell fortunes for money and for the amusement of crowds.

There is a saying along the great river that if the gypsies of Hungary and the Balkans cannot get back to their native mountains they die of homesickness, because they love them so well. But they leave them very often, because wandering is in their blood, and because only by going among people of another race can they obtain the gold and silver they much desire.

Beyond Belgrade the Danube forms the border between Jugo-Slavia and Rumania and, farther on, between Bulgaria and Rumania. Then it crosses Rumania, flowing northward and then to the east, and finally ends its course in the Black Sea.

This great waterway traverses fertile farming country and vast forests. It is a stream of the plains and a stream



*Ewing Galloway*

The blue Danube at Belgrade, capital of Jugo-Slavia. These boats transport grain and other products up and down the river.

of the mountains. In its upper course, in the highlands of Germany, Austria, and Hungary, the scenery along its banks is wild and romantic. But after leaving Hungary it is not a very picturesque river, except on the border of Rumania, where it has cut some great gorges through the cliffs.

But even in its most monotonous stretches the Danube is rich in history and legend. Conquerors of many centuries, who dreamed of becoming lords of Europe, have trod the Danube banks, for since very ancient times this broad river valley has been the main highway between Europe and Asia. Long before the beginning of the Middle Ages a tribe of barbarians called Goths lived there. Attila the Hun swept through this region when he came from Asia bent upon the conquest of Europe. It has echoed also to the tread of many chiefs since that day who dreamed of building empires for themselves in the West.

Out of the clay and sand gathered up along its course the Danube has built a delta fifty miles long on each side. In trying to make land and flow over it at the same time, it divides into three branches, so that where it enters the Black Sea there are three main streams instead of one. Because eroded material is unceasingly being carried down by the river, it is almost impossible to keep the channels of these deltas sufficiently clear for them to be of value to commerce. And because transportation from the Danube to the Black Sea is very important to the eight countries through which, or along whose borders, this river flows, in 1856 the various governments concerned created the European Commission of the Danube, and ordered it to open the mouths of the river for navigation within two years. The Commission is still at work, for opening the three mouths and keeping them open has been a stupendous task, one that has involved great engineering achievements. With the eroded material which is con-

*Aerofilms, Ltd.*

The Rhone and its valley, twelve miles below Lyon, as seen from an airplane. The industrial city of Givors appears in the foreground.

stantly being deposited, the river keeps building its bed higher. Therefore it has been necessary to construct levees along the lower course of the stream, and also to dredge the delta frequently as it becomes clogged.

The land along the delta of the Danube, built up by the stream itself, is swampy and overgrown with reeds and willows. It is very sparsely populated, being unfit for farming, and so infested by malarial mosquitoes that it is far from healthful. The few people living there are fishermen, who eke out a bare existence by shipping fish and baskets that they make from the reeds and willows.

### III. THE RHONE

Another great river of Europe is the Rhone, which flows out of the Rhone Glacier in Switzerland, through the Lake of Geneva, and down across France to the Mediterranean.



*Keystone View Company*

Ruins of a château on an isolated height, commanding a wide and magnificent view of the Rhone Valley near the southern coast of France. This stronghold was built about six hundred years ago. It is easy to imagine that it figured in many exciting raids.

Until it reaches the Lake of Geneva, the Rhone is a swift and turbid stream, and its water is gray with glacial clay. But in the lake it drops this sediment and comes out clear and bright.

Down to Lyon, the third city in France, it goes, where it receives a large tributary, the Saône, and moves on through

a fertile valley with a delightful climate, one of the most romantic regions in the world. Here on both sides of the stream are towns with a history dating backward more than a thousand years. In some of them are castles and fortresses begun by the Romans, who came this way almost two thousand years ago. The Goths and the Saracens who followed, continued the building the Romans had begun; and this was carried on still further by the kings of France. Between times, also, the strongholds were often wrecked by conquerors and had to be rebuilt.

Added to the historic interest of this section of the Rhone Valley is great natural beauty. Beyond the river on each side undulating hills rise tier on tier. In the broad plain between these uplands are fields of grain, gardens of flowers, vineyards, and groves of mulberry trees, on whose leaves silkworms feed. Plots of roses glow beyond the mulberry groves, for this is both a silk-producing and perfume-making country. And as the peasants till the fields, they have ever near them in the background ancient castles, strongholds of a long line of men who helped to give to southern France its eventful story.

To the west of the valley of the Rhone, towering above a small stream stands the mighty fortress of Carcassonne, a stronghold with a double ring of walls and fifty towers. The Romans under Julius Cæsar laid its foundation stones. Then the Goths came in, building upon what the Romans had started, and for several centuries remained in possession there, until the Saracens swept across the Pyrenees and drove them out. For about three hundred years chiefs from Africa were lords at Carcassonne, until Charles Martel conquered and expelled the Saracens from the country, after which the stronghold was held by a long line of French kings.

Toward the end of the Middle Ages Carcassonne fell into ruin. Robbers and criminals hiding from the law found

*French Line*

The towers of Carcassonne in southern France, the best example of a medieval fortress that may now be seen anywhere in Europe. With lovely valleys spread out below the hill in all directions and the river Aude winding along at its base, Carcassonne has for generations seemed to the French people one of the most beautiful spots on earth.

refuge there, and bats flew in and out among the deserted towers. This continued until less than a hundred years ago, when a French architect with a poet's fancy set about restoring the place. He strengthened the crumbling walls and recreated the broken towers with such fidelity to the original plan that today the fortress looks very much as it looked six hundred years ago. It has been called "the Sleeping Beauty of the Middle Ages," and seems a part of the life of that day, not decayed, but under the spell of slumber.

In the days of knighthood Carcassonne was more than a castle. A small city was included within its massive walls. Because of its gorgeous court, the splendor of its tournaments, and the contentment of those who dwelt there, it

was a delightful place. All up and down the Rhone Valley, stories of the past declare, people dreamed of going to Carcassonne as to the loveliest spot on earth. In a poem by Nadaud a peasant laments that he has missed the best thing in life because he "never gazed on Carcassonne."

I'm growing old ; three score today,  
And all my life in dust and mire  
I've labored hard, yet found no way  
To gratify my great desire.

They say 'tis foolish here below  
Full happiness to count upon,  
My prayer unanswered is to go ;  
I have not seen fair Carcassonne.

On the Rhone is Tarascon, another ancient, storied stronghold, where six hundred years ago lived one of the most splendid sovereigns of the Middle Ages, René of Provence, deservedly known as Good King René. He was the friend of Joan of Arc. He believed in her when other nobles of France declared she was crazy or an impostor, and he paved the way for her to have an audience with the Dauphin, afterward King Charles VII, who was his brother-in-law. During the siege of Orleans, when Joan was struck by an arrow, it was René of Provence who carried her to a place of safety. He threw the full weight of his wealth and influence toward obtaining her freedom when she was captured by the Burgundians and sold to the British, and had he had his way, she would not have gone to the stake at Rouen.

It was in an effort to win back some lost territory for René that Christopher Columbus received his first command. Naples and Sicily had been a part of this sovereign's holdings, but had been snatched away from him by a Spanish lord. John of Anjou, René's son, headed an expedition to try to regain these provinces, and in the fleet



that attempted the capture, the young Genoese sailor, Columbus, commanded one of the boats.

Alphonse Daudet, a celebrated French writer, chose Tarascon as the scene of one of his most delightful books — *Tartarin of Tarascon*. Tartarin was a jolly, good-humored fellow, a master of lying, and the accounts of how he went to hunt lions in Africa and how he climbed the Alps are among the great humorous tales of the world. Tartarin was a native of Gascony, a part of France where the people are noted for a love of exaggeration and for florid oratory. Of this no better example is to be found in literature than *Tartarin of Tarascon*.

Not far from Tarascon is Avignon, "City of Bells," a town that was once, for more than seventy years, the residence of the Popes. The capital of the Catholic Church was moved here from Rome in 1309, and the papal palace is still to be seen.

Avignon, with its wealth of vegetation and its pleasant site on the river, is a charming town. Carlyle says of it, "Papal Avignon with its castle rising sheer above the Rhone stream, beautifullest town with gold-orange groves."

At Avignon stand the ruins of the first bridge that spanned the Rhone, one of the finest in Europe in its day, about the building of which a pretty legend is told.

In ancient times not a single arch rose above the river, for here the Rhone tide is very swift, and although even from before the days of Charlemagne lords of southern France had set men to the task of bridge building, they did not succeed. As fast as the stones were raised, the stream tore them down again. It is a matter of history that Cæsar bridged the Rhone at its swiftest point in thirteen days, but the French had never heard of that feat and believed the river could not be spanned.

Then one day during the thirteenth century, tradition says, a boy named Bénézet was tending his father's flocks



far back in the hills beyond the Rhone. Suddenly he heard a voice say, "Go thou to Avignon and tell the people there that they must build a bridge across the great river."

At first Bénézet thought he must be dreaming. But again and again the words sounded, until he knew they were meant for him.

Bénézet never had been to the Rhone. He knew only that it lay miles beyond the hills where his sheep pastured,



*Keystone View Co.*

The Rhone at Avignon, "City of Bells," with the bridge of St. Bénézet, around which clings the legend of the shepherd boy. The impressive group of buildings (near the center of the picture) was the residence of the Popes during the fourteenth century.

toward the rising sun. But he set out to obey, and was miraculously guided to Avignon, where he persuaded the people to undertake the building of a bridge.

Some historians who have studied the old records think that Bénézet was, in fact, a skilled, experienced workman who belonged to a great organization of the Middle Ages called the Brotherhood of Bridge Builders, the members of which were very highly trained. But the people of Avignon always believed that only through a miracle was the bridge built across the river which for centuries had de-



Map showing the rivers, mountains, and important cities of France. Trace the courses of the Rhone, the Rhine, and other important streams. Notice that they form natural highways between central Europe and the seas on the north, south, and west. Notice the areas that are drained by each of the large rivers. The rich agricultural lands of France are in the river valleys. Trace the rivers of Spain and France that have their sources in the Pyrenees. The map shows Belgium also. Locate the independent principalities of Luxemburg, Andorra, and Monaco.

fied the efforts of all those who strove to span it. Even the bridge that Cæsar erected was not able to stand against its swift current very long. Many centuries passed before the science of bridge building became sufficiently advanced to cope with a stream having a current like that of the Rhone.

Very proud were the people of Avignon of their splendid bridge. The grown folk promenaded there. The children played above its great stone arches. So much of the life of southern France went back and forth across it that they had a song that runs like this :

On the bridge of Avignon,  
See them go, see them go !  
On the bridge of Avignon,  
See them dancing in a row !

Today there remain only four of the eighteen original piles of St. Bénézet's Bridge. These end abruptly in the river as if there had never been any more. On one of these stands the Chapel of the beloved St. Bénézet.

All along the lower part of the Rhone Valley are fascinating, ancient towns — Nimes, Arles, Orange, and several others — every one with ruins of structures built by the Romans, who conquered Gaul. Many volumes have been written about them and about the legends and stories that cling to this great river.

The Rhone divides southern France into two sections, each in its way renowned. East of the river is Provence, while to the west lies the province of Languedoc. During the Middle Ages each of these was the home of romance, poetry, and song.

In Provence lived the troubadours, poets who were employed by the great nobles of that land to sing for them, and who were so highly regarded that their masters supported them in luxury and fine state. Some of these men

were very gifted and left verses that rank as gems of literature to this day. They sang of the beauty of Provence's great ladies, of the bravery of her knights, of the splendor of her nobles, of the charm of nature, and of the magnificence of the tournaments that were yearly given at some of the river towns. At these Rhone Valley tournaments the wit and beauty of the entire region gathered to watch the contests of the knights and to see the victor in the contest crowned with a laurel wreath. It was then that the troubadours sang their blithest songs, and a garland of laurel went to him whose verses were adjudged the most beautiful. Poets were heroes at Rhone tournaments as much as cavaliers.

In Languedoc, life was much the same as in Provence. Here the poets were called *trouvères*, and here too they were greatly honored. But the lords in Provence were more numerous and richer than those in Languedoc, so rewards to the troubadours were greater than to the *trouvères*. Because of that, the men of greatest talent flocked to Provence, and consequently its singers are the ones whose fame has come down to us.

In its southern course the Rhone divides into many branches as it crosses a barren, rather desolate plain of alternate sandy hillocks and shallow ponds. This region is called *Bouches du Rhône* — Mouths of the Rhone. It is a stock-raising country with cow-boys and cow-girls, in many respects similar to the plains of northwestern Texas. As we told you in another chapter, this region has been built up by the stream itself as it extended its delta out into the sea.

Flowing down through its delta, the Rhone finally reaches the Mediterranean. Here the stream that had its beginning in glaciers of the Alps ends its course, after a journey of more than five hundred miles.

## IV. THE RHINE

Perhaps the most famous of the rivers of Europe is the Rhine, which has its sources in the Splügen Pass and elsewhere in the high Alps.

Gathering many snow-fed tributaries, this stream flows northward, forming the eastern boundary of Switzerland. Gray and turbid, because of the glacial clay its waters

*Ad Astra Aero*

Airplane view of the Falls of the Rhine at Schaffhausen, Switzerland. The great mass of water, in foaming torrents, pours over the ledge in a drop of sixty feet.

carry in its upper course, it enters the Lake of Constance or Bodensee, but comes out clear and bright, and for some distance moves placidly westward. Then it tumbles over a ledge of hard rock and makes the famous Falls of the Rhine at Schaffhausen.

From Schaffhausen the river flows with even current westward to Basel, or Bâle, as the French spell the name. On the way it receives its largest tributary from Switzerland, the Aar, which has its source in the glaciers of the Finsteraar and Lauteraar.



At Basel the Rhine, bending suddenly to the north, sweeps with smooth current through the broad valley separating the Black Forest from the Vosges Mountains, and forms the boundary between Alsace and Baden. All the while, as it moves through the lowlands, it grows steadily larger because of the numerous tributaries that feed it. The Ill, the chief river of Alsace and celebrated for its delightful scenery, comes into it near Strasbourg, the largest city in the upper Rhine district.

Strasbourg is not on the Rhine, but is situated on the Ill several miles west of the larger stream. It is a city with a long, troubled history, for the Romans laid its foundation several years after the beginning of the Christian era. Following that, it was held by native German tribes, and later was seized by Louis XIV and added to France. It was held by France until the close of the Franco-Prussian War in 1871, when, as a part of the province of Alsace, it was ceded to Germany. After the World War, by the terms of the Treaty of Versailles of 1919, it went back to France.

Strasbourg has a noted university and a splendid cathedral, in which is a very wonderful clock. In this clock the figure of an angel strikes the quarter hours on a bell in his hand. At regular times numerous figures step out of niches in the clock. On Sunday, Monday, Tuesday, and on through the week come Diana, Apollo, and various gods and goddesses of the Romans. At noon on each day the twelve apostles move around the figure of Christ. On the highest pinnacle of the clock is perched a cock that flaps its wings, stretches its neck, and crows so loudly it can be heard all over the cathedral. All in all, the clock of Strasbourg is the most wonderful timepiece to be found anywhere in the world.

As the Rhine flows north, it sweeps past Mannheim, and here it is fed by the Neckar, a stream that drains the Black Forest. Mannheim is noted as being the most regu-



Ewing Galloway

Heidelberg, Germany, on the banks of the Neckar River. On the rising land beyond the town is the great castle, center of many a siege during ancient times. Near it is the university, the cradle of science in south Germany.

larly laid out city in central Europe. Its streets run parallel with one another and at right angles, like those in most American towns, which is not the custom in the Old World. Mannheim was the home of the great poet, Schiller, who wrote *Wilhelm Tell* and other fine heroic dramas.

About twelve miles southeast of Mannheim, on the Neckar, is Heidelberg, a majestic and well-preserved city, and one of the most celebrated and interesting, not only of the Rhine country but of all Germany. Its castle, a noble pile of red sandstone slabs, was begun by Conrad of Hohenstaufen, one of the ancient rulers of the Rhine country, during the tenth century. Lords of succeeding centuries enlarged and strengthened it, and for more than five hundred years it was a place of stirring events. Besieged in half a dozen wars, it was captured and recaptured by contending sover-

eigns. Time also lent a hand to the destructive work in which these battling chiefs were engaged, until at the opening of the nineteenth century the ancient stronghold was in a ruinous condition. Within the last fifty years, however, it has been partially restored, and now one may see some of the chambers, walls, and towers as they were during the Middle Ages.

The University of Heidelberg, founded in the fourteenth century, was the cradle of science in South Germany and one of the oldest universities in central Europe. Hundreds of men whose names have gone down in history as great scholars, scientists, writers, and philosophers have studied there.

The library of Heidelberg is a treasure house of ancient books. It contains not only thousands of the most precious books of modern times, but papyrus volumes from ancient Egypt and rolls of parchment and vellum such as made the books of Greece and Rome. Added to these are many beautiful tomes hand-printed and illuminated by the monks in the monasteries of Switzerland and Germany, who were among the first bookmakers in western Europe. Nowhere in the world is there to be seen a finer exhibition of the learning of the past than at Heidelberg.

The Main joins the Rhine about thirty miles below Mannheim. This stream flows from the east, coming down from the hills of northern Bavaria. On the right bank of the river is Frankfort-on-Main, a city of over four hundred thousand people. Frankfort was long a free city, independent of outside political control, even of the emperors, and it was also at times the residence of German sovereigns.

Frankfort is a very old city, and during the Middle Ages was celebrated for its fairs. In spring the Easter Fair was held there, and in the fall the Autumn Fair. From all over Germany people flocked there at these times to buy and sell. The fairs of Frankfort made it the chief trade center

of the middle Rhenish district, and to them the town owed its prosperity. For centuries Frankfort was the center of the German book trade. Its Book Fairs, which were a part of the Easter and Autumn Fairs, drew scholars and book dealers from half a dozen European countries, and were the delight of lovers of literature.

Frankfort is noted as being the birthplace of Goethe, greatest of German poets, and also of the Rothschilds, "the Six Gentlemen of Frankfort," the most celebrated financiers of their day.

On the left bank of the Rhine, a short distance below the mouth of the Main, is Mainz, a thriving commercial city with fine modern buildings, well constructed streets, and river promenades. Mainz is a very old town. It was founded by the Romans, and during the Middle Ages, because of its river trade, became so prosperous that it was called Golden Mainz. Like all the Rhenish towns, it has had an eventful history. During the warring days of old it was taken and retaken by conquerors who wanted to be lords of western Germany.

Below Mainz is the quaint town of Bingen. From here to Cologne the channel of the Rhine is narrow and the current swift. In this region the scenery along the banks is very picturesque; every available crag is the seat of an ancient castle, the abode of some baron of long ago.

The very first of the castles, as one goes down the river from Bingen, is the Mouse Tower, standing on a quartz rock which forms an island in the middle of the stream. It was erected for the purpose of collecting toll, an easy way for the lord who owned it to rob those traveling up and down the river. It was called Mäuseturm, or arsenal, but the people changed the name to Maus (Mouse).

There is an old story that Bishop Hatto of Mainz had here a barn well stocked with corn. During a famine that brought great suffering to that section of the Rhine Valley,



*Ewing Galloway*

The Rhine at Bingen, Germany. The eastern bank, the Niederwald, is covered with vineyards growing in terraces. Some of the vineyards in this region are said to have been planted originally in the reign of Charlemagne, and though destroyed during times of warfare, they were replanted and have long been tended with extreme care.

the poor came to him and begged for some of the grain. He told them to go into the barn and help themselves. Then he set fire to the place, saying that the people within it were like mice devouring corn. All who had appealed to him were burned to death. Soon afterward, the legend says, hordes of mice came out of the ruins of the barn, pursued the bishop, and devoured him.

Across from the Mouse Tower rise the ruins of Ehrenfels — Rock of Honor the name means, although there was little honor about the robber chiefs who held it during the past. Ehrenfels stands among the vineyards of Rüdesheim, the most picturesque and beautiful in central Europe. Behind it rises the Niederwald, a rounded height com-



manding a superb view. Here stands the national monument, "Germania," a woman's figure of heroic size representing the German empire.

In the Niederwald country the snow melts earlier than anywhere else along the central course of the Rhine. Because of this fact, an old legend says, Emperor Charlemagne loved the region better than any other spot on earth. According to the story, it was so dear to him that even after his death he could not stay away from it, but came back during the balmy summer nights to walk between the grapevines. Some of the peasants declare that even yet he returns each year and blesses the vineyards, and for that reason the grape yield of Rüdesheim is heavier than that of any other part of Germany.

One of the German poets thus recounts the legend of Charlemagne blessing the vineyards :

On the Rhine, the green Rhine, in the soft summer night,  
The vineyards lie sleeping beneath the moon's light;  
But oh, there's a shadow on green hill and glade  
Like the form of a king in grandeur arrayed.

He has come from his tomb that's in Aix-la-Chapelle,  
He has come to the stream that he once loved so well,  
Not to ban, nor to blight with his presence the scene,  
But to bless the bright vineyards by Luna's soft sheen.

The moonbeams they make a bold bridge o'er the Rhine,  
From Winkel to Ingelheim brightly they shine;  
Behold, by this bridge the great monarch goes over,  
And blesses the banks with the warmth of a lover.

He blesses each vineyard on valley and hill,  
Each village, each cottage his blessing doth fill;  
He blesses each spot on the shore, on the river,  
That he loved in his life, that forget he can never.

Then back to his tomb that's in Aix-la-Chapelle  
He returns from the scene that he still loves so well,  
There to slumber in peace till another year's over,  
And the vineyards once more woo him back like a lover.

Farther down the river appears the Falkenburg, another stronghold of the barons of the Middle Ages. On the opposite side rises the tower of Sooneck, destroyed and rebuilt several times during those old centuries of warfare, but now restored and inhabited.

Other ancient castles, some of them restored, follow in due course. One known as Pfalzgrafenstein stands in the middle of the stream — another place for the collection of toll by a baron who preyed upon all traveling along this waterway.

Below Pfalzgrafenstein are Gutenfels and Schönbürg, great strongholds in their day, and now a mass of picturesque towers and ruins.

Farther on is the town of St. Goar, opposite which rise the ruins of Katzenelnbogen (cat's elbow) and Hohenfels (high rock). Above these ruins is the jutting cliff where the Lorelei was supposed to sit and attract boatmen to their doom.

Not far below the Rock of the Lorelei is the great castle of Reichenberg. This was never actually destroyed, but was merely abandoned and fell into decay through neglect. In this same region, too, is Rheinfels, once a massive fortress which figured largely in the history of the Middle Ages, when it was frequently captured and recaptured, changing owners with the changing fortunes of the warring chiefs of this region. Its ruins are the most imposing on the river.

High on the cliffs, on the right bank of the Rhine, separated by a moat and a massive wall, are the castles of Sterrenberg and Liebenstein, sometimes known as the Brothers. Tradition says they belonged to two brothers who were the best of comrades until a quarrel over a fair lady made them bitter enemies. That is the reason for the dividing wall and moat between the castles.

As we travel on down the river, we come to Castle Stolzenfels, one of the finest on the Rhine. Stolzenfels is not now in ruins. For centuries it towered, broken and decay-

ing, above the river, but less than a hundred years ago it was restored.

Stolzenfels is sometimes called the Castle of the Raven, because a stone raven is sculptured on its outer gate. This is said to have been placed there in memory of a pet bird that once saved the life of its mistress when she was held a prisoner. An unscrupulous chief attempted to starve her to the point where she would hand over her lands to him, but the raven brought in through her prison bars wild berries and fruit found in the forest, and supplied her with food until she was rescued by her brother on his return from the Crusades.

Besides the many castles we have mentioned, there are numerous others along the Rhine, more than on any other river in the world. So it is not strange that for hundreds of years this stream has been called "the castled Rhine."

A few miles below Castle Stolzenfels we come to Coblenz, a handsome modern city of sixty thousand people, finely located on a bend of the river. Here the Rhine is joined by the Moselle, a picturesque stream that flows from France through a valley rich with vineyards.

Opposite the junction of the Rhine and Moselle stands a huge fortress called Ehrenbreitstein — Broad-stone of Honor — supposed for years to be the most invincible stronghold in Europe. At the close of the World War the German armies were forced to give it up. It was entered and occupied by American troops after the Armistice of 1918.

The next city past which the Rhine flows is Bonn, a beautiful town with a cathedral, a university, numerous fine buildings, and a bridge justly famed among the bridges of the world. But Bonn is better known as the birthplace of the great musician, Ludwig van Beethoven. The house where he first saw the light is still to be seen.

Below Bonn the Rhine widens, and a little farther on is Cologne, the largest city on the river. Its cathedral is the

finest in Germany, and one of the noblest in the world. A glorious structure it is, with arches so high and perfectly shaped that they are the marvel of architects.

In the cathedral of Cologne is a famous and beautiful chamber called the Chapel of the Three Kings. Legend says that here for a time were buried the bones of the Magi, the Wise Men of the East, who followed the star to Bethlehem and laid gifts at the feet of the infant Jesus. Because of this story of the Three Kings, the emblem of Cologne consists of three crowns.

Cologne has also a bridge-of-boats, a relic of the time when there were no arches spanning streams, and boats were placed between the banks and securely chained together to make a floating bridge.

Below Cologne the Rhine moves down through the German lowlands and across the border into the Netherlands, where it splits into several branches. The main stream joins the Meuse, the chief river of Belgium, while the much smaller northern branch, or Old Rhine, goes on its way to the sea through the city of Leyden.

## CHAPTER SEVEN

### WATERWAYS OF SOUTH AND NORTH

#### I. RIVERS OF THE ITALIAN LOWLANDS

##### THE RIVER PO

RISING in the mountains of western Piedmont, where it surges out of wild gorges at the base of the Pennine Alps, the Po, largest stream of Italy, moves eastward toward the lowlands. As it proceeds on its way, it is swollen by streams from the melting snow of the high mountains, among them the swift Dora Baltea, which has its source near the foot of Mont Blanc. Farther on the Po is joined by the Ticino, which drains beautiful Lake Maggiore.

The river Adda, rising among the Tyrolean Alps and leaping toward the lowlands through a succession of deep gorges, also pours its waters into the Po. On its way it flows through Lake Como.

Near the city of Mantua, in which the Tyrolese patriot Andreas Hofer was executed because he had stood for the freedom of his native land, the Mincio joins the Po. It is a romantic, winding stream that has its source among the mountains of Tyrol. On its way to the Po, the river enters the basin of Lake Garda, bluest of all lakes, and coming out of it at the southern end, carries the overflow to swell the Po.

As the Po moves through the Italian lowlands, it traverses the plains of eastern Piedmont and Lombardy, among the most fertile districts in Europe. These plains yield rice, maize, grapes, and small fruits. Mulberry trees thrive there, and upon mulberry leaves the silkworm feeds. So Piedmont and Lombardy are among the chief silk-producing regions of the world.

Like the Rhine, the Danube, and the Rhone, the Po flows through a number of notable cities. Largest and most



interesting of these are Turin and Cremona. Turin is a great commercial center of over five hundred thousand people. Cremona, very much smaller, is celebrated as being the place where the finest violins the world has ever known were made. Here some five hundred years ago lived a group of men known as "the violin makers of Cremona" — Amati, several brothers named Guarnarius, and Antonio Stradivarius, whose lives were spent at the workbench fashioning instruments to give out entrancing melody. All of them were master craftsmen, but the king of the group was Antonio Stradivarius, who toiled so unceasingly in his shop that the neighbors thought something was wrong with his head. He took no vacations even after he became rich, but labored from sunrise until dark when he could afford to live in idleness, because he cared more for violin making than for anything else in the world. And because he did, he gave to his native town a glory of which all Italy is proud. Today when Cremona is mentioned people rarely think of the town itself but of the greatest of all violin makers, Antonio Stradivarius, who, from the time he was a lad of fourteen until he was eighty years old, spent his days and many of his nights at the workbench, and by so doing gave unmeasured pleasure to mankind.

From the place where the Po receives the Mincio it becomes a characteristic lowland stream. No longer does it flow swiftly, like a river of the mountains, but moves sluggishly through sandy marshes formed out of material it has carried from far inland, and separates into many channels as it nears the Adriatic, in which it ends its course.

#### THE ADIGE

Another important river of Italy is the Adige, formed by glaciers of the South Tyrol, and fed by numerous streams that have their beginning in the snow fields of the Dolomites and other eastern Alps. Down through beautiful up-



*Wehrli, Ltd.*

"The eager Adige" at Verona, where the river rushes under the ancient bridge of St. Peter. The current is so strong that navigation is difficult.

lands and across the northern Italian plains of Venetia it goes, and finally empties into the Adriatic about twenty miles south of Venice.

The chief town on the Adige and the loveliest is Verona, of which William Dean Howells once wrote :

In truth no city has a fairer site  
Than hers upon the eager Adige.

The story of Verona is long and eventful. First it was a Roman colony. Then the Goths held it, and later it came under the control of several powerful Italian families, the most noted of which were the Guelphs and the Ghibellines. For a long time these two houses warred against each other, and the history of Italy during the Middle Ages is largely an account of their struggles. Nowhere did bitter feeling run higher than at Verona. Shakespeare made that town

the scene of his play, *Romeo and Juliet*. Romeo Montague and Juliet Capulet, in the play, belonged to families taking opposite sides, one with the Guelphs, the other with the Ghibellines. But although their houses were enemies, the two young people loved each other devotedly, and the account of their romance six hundred years ago, as given by the great dramatist, makes an appealing tale.

#### THE ARNO AND ITS CITIES

In the central part of Italy is a fertile, beautiful lowland region called Tuscany. Across it flows the river Arno, coming down from "the wind-grieved Apennines." Only a little river is the Arno, but it has a great place in history because of two cities on its banks, Florence and Pisa.

In Florence, a place so lovely that it is called "the Lily of the Arno," poets and artists have loved to dwell. Some of the greatest painters, sculptors, architects, and writers have lived and worked in Florence, among them being Dante and Petrarch, Italy's most celebrated poets, and Cimabue, Giotto, Raphael, Michael Angelo, Leonardo da Vinci, and a score of other famous painters. In this city on the Arno some of them spent their entire lives, and found perpetual inspiration in the beauty of the place and in the encouragement of its nobles, for the lords of Florence loved beautiful things. They were ever ready to bestow friendship and praise, as well as large sums of money, on whoever created a noble picture, statue, or song, and they urged the gifted men who lived among them to produce their best. And the artists and poets responded gloriously, making Florence a center of art and literature unsurpassed anywhere in the world. No city in any land is richer in masterpieces of painting, sculpture, and architecture than "the Lily of the Arno."

Farther down the Arno is the city of Pisa, once of such great commercial importance that it was a rival of Venice,

*Donald McLeish*

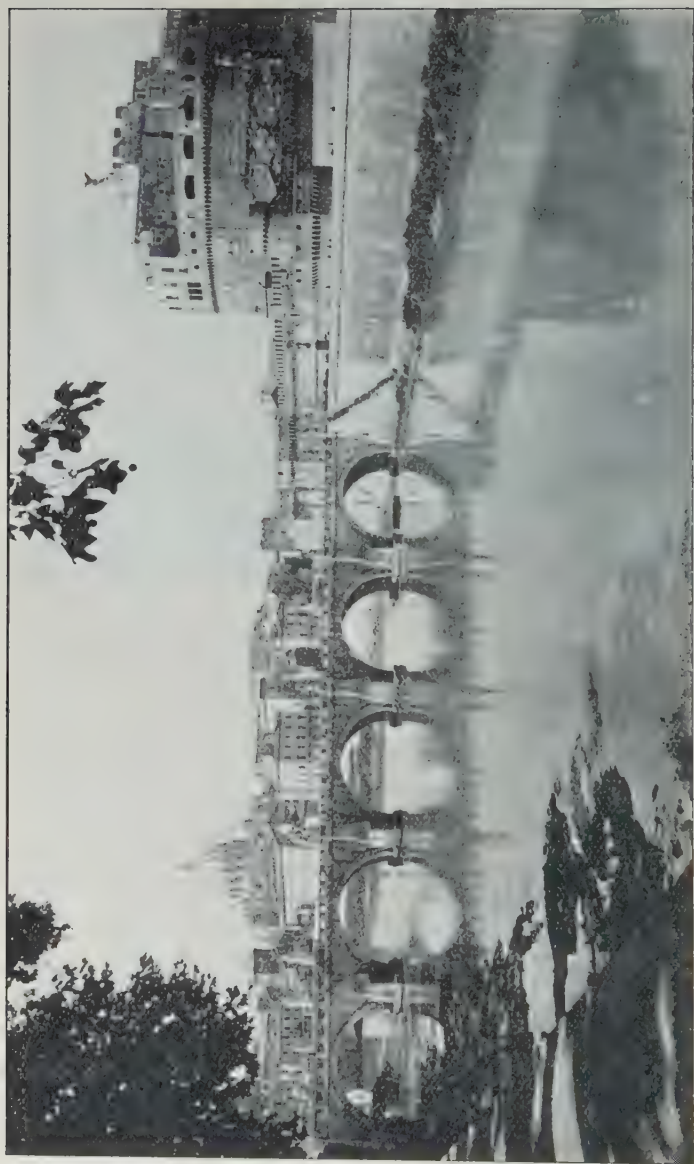
The Arno flowing through Florence, one of the most important cities in Italian literature, art, and history. The graceful bridges across the Arno have played their part in song and story. The middle bridge, called Ponte Vecchio (meaning ancient bridge), is lined with two-story buildings now used as shops.

now known chiefly for its famous Leaning Tower. This tower, unique among buildings of the world, is a hundred and seventy-nine feet high, and leans so far that the top extends thirteen feet out beyond the base. In olden times people in Italy built bell towers beside the cathedrals. The Leaning Tower is Pisa's Campanile, or bell tower, and stands beside her cathedral.

Galileo, the great student of physics and astronomy, lived in Pisa and conducted his experiments on falling bodies from the Leaning Tower.

#### FATHER TIBER

One of the most noted streams of the world is the Tiber, which rises in the Apennines and flows down into the plains



*Leaning Gallery*

"Father Tiber" winding its way through the city of Rome. Beyond the bridge, with its dome towering high above the surrounding buildings, is the Church of St. Peter, largest in the world. In the foreground on the right is the Castle of St. Angelo, one of Rome's most celebrated buildings. It was erected almost eighteen hundred years ago, and the Emperor Hadrian and several other Roman emperors were buried here. For centuries it has served as both a fortress and a prison.



of Umbria, then southward until it reaches the great city of Rome, where it turns to the west and goes on to the Mediterranean.

Through its mountain stretches, the Tiber is swift and attractive, but in the Italian lowlands it becomes turbid and dull. It is by no means a poetic waterway in appearance, yet much poetry has been written around it, because in the days of ancient Rome it meant very much to the people. Up and down its course went the commerce of that nation. The people called the river "Father Tiber" and used to pray to it.

In some respects the Rome of the ancients was the most wonderful city the world has ever known. The architecture of the Romans was superb. They built beautifully and lastingly, like the Greeks, because they believed that the gods see everywhere, and so each hidden part was as painstakingly and perfectly done as the portions that were to meet the gaze of mankind. Because they gave such zeal and care to their work, their temples, palaces, baths, and arenas have stood throughout the ages. These ancient structures are in ruins now, but they are imposing ruins, even after the passing of two thousand years.

The most celebrated remains of the past to be seen in Rome today are the Forum, the marketplace in the time of the Cæsars, and the Colosseum, a magnificent circular arena built of great stone blocks, where the athletes displayed their skill.

The modern part of Rome also is impressive. This city is the center of the Catholic church and the residence of the Pope. The Vatican, his home, is one of the most superb palaces in the world. The Church of St. Peter, adjoining the Vatican, is the largest of all churches. With its semicircular avenue of columns, its frescoes, mosaics, and paintings done by the greatest masters, it is the pride of the Rome of today. Another of Rome's fine modern build-

ings is the Quirinal, the residence of the Italian king, located on the highest of the seven hills of ancient Rome.

Rome is often called the Eternal City. The ancients gave it that name because they believed it would stand forever, and worshiped it almost as they worshiped their gods. They thought the most glorious thing in the world was to be a Roman, and to live in Rome was to be almost in Paradise.

## II. STATELY STREAMS OF FRANCE

### THE SEINE

Besides the Rhone, there are several large rivers in France, each of which is a storied stream.

In the north is the Seine, which takes its course among the hills of Burgundy, a province celebrated for its wine, and flows generally to the northwest, emptying into the English Channel. The Seine is nearly five hundred miles long, and for about a third of its course is navigable for local trading steamers.

A stream of many towns and cities is the Seine. Largest and most splendid of them is Paris, the capital of France, with a history dating back to the time of Charlemagne, and today one of the most interesting and attractive cities in the world.

In flowing through Paris, the Seine moves under thirty-one great bridges, some of which were built more than three hundred years ago. One of these bridges, the Pont au Change, was in ancient days the chief banking place of the city. Here money lenders sat on benches and carried on their business. Money lenders of olden times always sat on benches in public places to conduct their affairs. In the French language the word for *bench* is *banc*, and from it we get both *bank* and *banker*.

After leaving Paris, the Seine flows north through the

*Ewing Galloway*

The Seine with its close succession of bridges in the oldest part of Paris. This vast city has grown from a settlement on a small island in the Seine.

green, luxuriant province of Normandy, so named because of the fact that here, more than a thousand years ago, settled the Northmen, who sailed down from Scandinavia led by their chieftain Rollo. They started in to conquer France, and for a while it looked as if they would succeed. So Charles the Simple, who was king at that time, signed a treaty by which he agreed to cede to Rollo a large district bordering the English Channel, and because it was the home of Northmen it came to be called Normandy.

As the Seine moves north through Normandy, it passes a stately ruin high on a cliff above the river, called Château Gaillard. During the Middle Ages this was one of the great strongholds of Europe. It was built by England's king, Richard Cœur de Lion (the Lion Heart), who was far more



*Aerofilms, Ltd.*  
The fair valley of the Loire. This airplane view shows the river moving placidly on its way through one of the many towns that dot this section of France, past attractive homes, gardens, and well-tilled farm plots.

French than English, and who spent most of his childhood in France. His mother, Eleanor of Aquitaine, was a French princess, and the son inherited her fondness for the land of the Seine and Rhone. Richard loved Château Gaillard better than any other place and passed some of his happiest days there.

On the Seine River stands Rouen, a quaint city with an eventful history. It was in Rouen that Joan of Arc was tried and sent to her death. This city has a great cathedral and other fine buildings, and possesses also one of the most celebrated clocks in Europe. During the Middle Ages only the very rich could afford timepieces in their homes. Therefore public clocks were placed in cathedrals, town halls, or bell towers, so that everyone might read the passing of the hours.

Where the Seine enters the English Channel stands the city of Le Havre, a busy commercial center, for the mouth of the river forms a fine harbor into which the largest ocean-going vessels can come.

#### THE LOIRE AND ITS LOVELY VALLEY

One of the garden spots of France, and of the world, is the valley of the Loire. This is the most important stream entirely within French territory. It rises among hills in the southeastern part of France, flows first to the north, then to the west, and ends its course in the Bay of Biscay. The largest cities on the Loire are Orleans, Tours, and Nantes.

Orleans is celebrated in history as being the place where the French under Joan of Arc struck their first effective blow against the British and Burgundians. The siege of Orleans was the first event in a chain of happenings that made possible the deliverance of France, and it is because of her work here that Joan is known to history as the Maid of Orleans.



For several hundred years Tours has been one of the chief silk manufacturing centers of France. In the fertile Loire Valley mulberry trees flourish, and silkworms by the millions feed upon their leaves. The mulberry brings much prosperity to this region, for the market for silk is never over-supplied, and the price is always high enough to make the production profitable.

Tours is a handsome town, once the capital of the old province of Touraine. It has several palaces that were homes of French kings and a beautiful cathedral.

About thirty miles from the mouth of the Loire is Nantes, one of the great shipbuilding cities of France. Nantes is celebrated as being the place where the Edict of Nantes was signed, which gave to the people of the region the right to worship as they pleased. For a time this edict ended religious wars in France, which sprang up again when it was revoked.

Throughout most of Europe each important town has a cathedral, because, during the early Middle Ages, there were men who built for the joy of the building, who found such satisfaction in helping to raise a noble edifice that they were willing to serve without money. These made up the Brotherhood of Builders, an organization of highly skilled craftsmen who journeyed from land to land erecting churches, and asking nothing in return for their labor but food, clothing, and a bed. The satisfaction of creating something splendid and enduring was sufficient reward for them, and in building because they loved it, they beautified the face of Europe. In Italy, Spain, Belgium, France, England, Germany, and Austria they left their glorious handiwork, and the entire beauty-loving world is grateful to them to this day. In those times there was no outlet for engineering ability save in erecting religious edifices, just as there was no career open to artists save to paint angels and the Madonna for the decoration of some church.



*French Line*

The cathedral at Amiens in northern France, one of the many glorious churches erected during the Middle Ages by the Brotherhood of Builders. It was begun in 1220 and is considered the finest example of Gothic architecture in Europe.

## THE GARONNE AND THE CANALS OF FRANCE

The Garonne is a river of the French southland. It rises in the Pyrenees across the Spanish border. It is broadened and deepened by numerous mountain streams, and descends swift and clear until it reaches the sandy lowlands. Then it moves on less rapidly to Toulouse, a city of nearly two hundred thousand inhabitants and one of the most prosperous in France.

At Toulouse the Garonne meets the Canal du Midi, or Canal de Languedoc. This canal extends to the southeast from Toulouse through the old province of Languedoc to the Mediterranean; and another canal follows the course of the river northward toward its mouth.

The story of the building of the Canal du Midi is a tale well worth telling. About two hundred and fifty years ago a rich man of this region believed the Garonne Valley would be one of the finest lands on earth if its produce could go by water to both the Atlantic and the Mediterranean. So at his own expense he built the canal. It cost thirty-four million francs — then nearly seven million dollars — but he spent that vast fortune cheerfully because of the benefit it would be to his country.

About sixty miles from the mouth of the Garonne is Bordeaux, a city of nearly three hundred thousand inhabitants, with fine public buildings, a university, a cathedral, and beautiful parks, gardens, and residences. It is a bustling commercial city, for its location on the river, which from here to its mouth is navigable for large vessels, makes it an important shipping point.

Besides the Canal du Midi, France has numerous other artificial waterways, so many, in fact, and so well developed that they form a great system. Where the bed of a navigable river is too irregular for the easy passage of boats, side canals have been constructed as an aid to commerce. Also,

*Ewing Galloway*

A tree-shaded canal in France, typical of the system of artificial waterways on which freight is hauled on barges like the one shown in the picture.

most of the large rivers are linked by canals, and from several of them canals extend to the Mediterranean or the Atlantic. Thus by water France has a passage for goods from central Europe and from the Mediterranean to the Atlantic Ocean. Being state property, in most cases the canals may be used free of charge. In some places, however, where, because of the slope of the land, locks must be provided and the upkeep is costly, each boat passing through must pay a small toll charge. These canal vessels are generally barges towed by small steamboats or horses. Though they are by no means modern, up-to-date craft, they contribute largely to the great commerce of France, for they carry along her canals more than three billion tons of goods each year.



## III. RIVERS OF SPAIN

Flowing down from the Montes Universales in eastern Spain, is the river Tagus, which drains the interior of Spain and Portugal. It flows west for almost five hundred miles and empties into the Atlantic Ocean at Lisbon, which is an important seaport.

The largest city on the Tagus in Spain is Toledo, situated in the hills, and long noted for its manufacture of swords, called the Toledo blade. It is a very ancient city, one of the oldest in southwestern Europe. The remains of buildings erected by the Romans are to be seen even today. In later years the Moors captured it and remained there until 1087, when a Spanish patriot called the Cid Campeador headed the army of the king and drove them out.

*Ewing Galloway*

The Tagus River at Toledo, one of the most ancient cities of Spain. The river flows around the city on all sides except the north. The fortified bridge shown in the photograph dates from the time the Moors held possession here.



Most famous of the Spanish rivers is the Guadalquivir, rich in historic memories and enveloped in a halo of romance. The Guadalquivir flows past Seville and Cordova, in both of which are many traces of the Moors, who during the seventh century came across from Africa by way of the Strait of Gibraltar, took possession of Spain, and held it for almost seven hundred years. They were a gifted, beauty-loving people, and wherever they settled they left graceful towers and arcaded buildings. Of all the places they occupied in Spain, Seville is the most beautiful. The Spaniards are so fond of this old Moorish town that they have a proverb which says, "Whom the gods love owns a house in Seville."

The cathedral at Seville, originally of Moorish design, contains the body of Fernando, son of Columbus, and many important documents concerning Columbus are preserved in its library. The Torre del Oro, or Tower of Gold, also partly Moorish, once served for the storage of precious metals brought from America. In another building is a collection of manuscripts relating to those parts of the New World which came under Spanish rule.

In the Middle Ages Cordova was the most famous center of learning and literature in western Europe. At that time it had about a million inhabitants. Its great cathedral is a noted specimen of Moorish architecture. From Cordova comes a specially fine quality of leather and also silverware.

The swift Genil, a tributary of the Guadalquivir, flows westward down from the Sierra Nevada past the fascinating city of Granada. This is magnificently situated on a mountain slope at an elevation of more than three thousand feet, with two peaks over eleven thousand feet high rising above it. Its great fame comes from the fact that it contains the Alhambra, the wonderful old fortress and palace of the Moorish kings, the very finest example of Moorish art. Washington Irving lived for a time within the walls of this

enchanting place and wrote a delightful book about it. Longfellow expressed his youthful memories of this land of romance in the poem "Castles in Spain."

How much of my young heart, O Spain,  
 Went out to thee in days of yore!  
 What dreams romantic filled my brain,  
 And summoned back to life again  
 The Paladins of Charlemagne,  
 The Cid Campeador!

And shapes more shadowy than these,  
 In the dim twilight half revealed;  
 Phœnician galleys on the seas,  
 The Roman camps like hives of bees,  
 The Goth uplifting from his knees  
 Pelayo on his shield.

There Cordova is hidden among  
 The palm, the olive, and the vine;  
 Gem of the South, by poets sung,  
 And in whose Mosque Almanzor hung  
 As lamps the bells that once had rung  
 At Compostella's shrine.

But over all the rest supreme,  
 The star of stars, the cynosure,  
 The artist's and the poet's theme,  
 The young man's vision, the old man's dream, —  
 Granada by its winding stream,  
 The city of the Moor!

#### IV. STREAMS OF THE BRITISH ISLES

##### THE THAMES

The chief river of England is the Thames, at first a gently winding stream that comes from the east slope of the Cotteswold hills in Gloucestershire, in central England. (*Shire* is an old English word meaning county.)



*Aerofilms, Ltd.*

The Thames River at Henley, about forty miles upstream from London. This airplane view was taken during a regatta. For many generations Henley has been famous for its boat races.

After leaving Oxford, the seat of the oldest university in England, founded by Alfred the Great, the Thames proceeds to London, with many windings through meadow lands and past towns noted in British history. From there it flows to the North Sea, its mouth being a broad and muddy estuary. An estuary is a river mouth in which the tide comes up, as in the Hudson, the Delaware, and other streams of the eastern United States.

London, the capital of Great Britain and largest city in the world, has a history that extends back over two thousand years. First it was the seat of an ancient British tribe. Then the Romans held it, and after them the Saxons, whose



*Aerofilms, Ltd.*

Airplane view of rich agricultural lands near the river Ouse in eastern England. Across the scene runs the Great North Road, which has been a highway since the days when the Romans occupied the country. The roads made by the Romans to connect their military camps were so well built that many of them form the basis of modern roads.

most illustrious king was Alfred the Great. It was plundered by the Danes, rebuilt by the loyal Saxon people under the leadership of Alfred, and ever since that day the varied events that make up the story of a nation have occurred within its boundaries. It has known long, terrible wars and joyful, prosperous years of peace. It was almost destroyed by fire about three centuries ago, but under the direction of a great architectural genius, Christopher Wren, was reconstructed into a more beautiful city than it had been before. And during the occurrence of all these events the Thames has moved calmly through it on its way to the sea.

A distinguished English statesman and labor leader, John Burns, once stood on the heights of Quebec looking at the broad sweep of the St. Lawrence as it comes down from Montreal. Somebody asked him if he did not think it the noblest stream he had ever seen. "No," he answered, "the Thames is finer, because it runs liquid history."

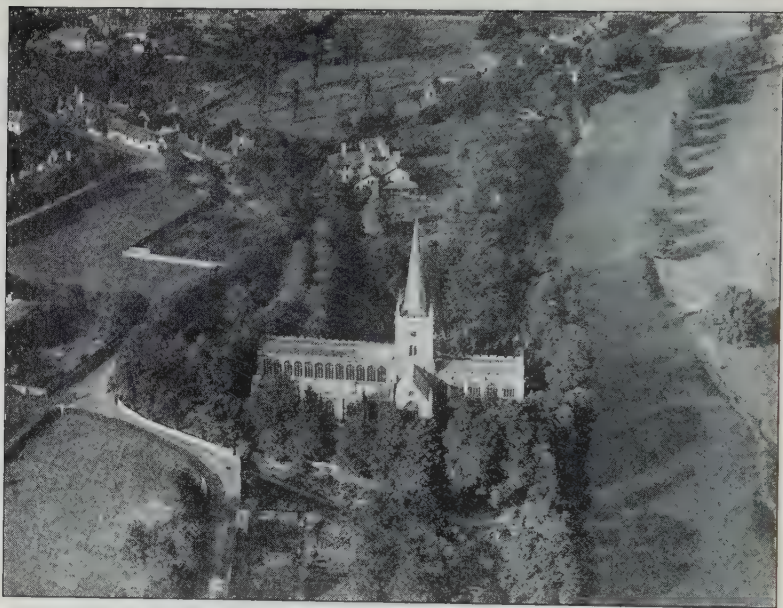
#### THE SEVERN AND THE AVON

The Severn is the longest of British rivers, but it does not carry very much water. It has its source among the hills of central Wales, in a region so rugged that people speak of it as "wild Wales." Flowing to the northeast, the Severn crosses the border into England, and after watering the broad rich plain of Shrewsbury, goes on to the south and enters the Bristol Channel. It has a broad estuary, wider even than that of the Thames where it enters the North Sea.

The Avon, flowing to the Severn, is celebrated as being the river upon whose banks William Shakespeare played when a boy. This great master of English was born in the quaint town of Stratford. He lived there most of his life, and the Avon will be forever associated with his memory.

Shakespeare thought the Avon the most charming of all





Central Aerophoto Co., Ltd.

Airplane view of the Avon as it flows through Stratford, the town where Shakespeare lived during boyhood and his later years. Trinity Church, in which he was buried, is shown in the photograph.

streams. It was of one of his favorite haunts on this river that he wrote the lovely song that is sung by Oberon in *A Midsummer Night's Dream*.

I know a bank whereon the wild thyme blows,  
Where oxlip and the nodding violet grows,  
Quite over-canopied with luscious woodbine,  
With sweet musk-roses and with eglantine.

Another great man who spent part of his life on the Avon was John Wycliffe, a famous English scholar and preacher known to history as "the Morning Star of the Reformation." He made the first complete translation of the Bible into English. After his death his body was burned and the ashes were cast into the Swift, a stream that flows

into the Avon. An old song referring to that burial runs like this :

The Avon to the Severn runs,  
The Severn to the sea,  
And wheresoever their water comes  
Old Wycliffe's bones may be.

#### RIVERS OF IRELAND AND SCOTLAND

In the uplands of the northern part of Ireland rises the Shannon River, a delightful stream that flows down through a chain of beautiful lakes to the Atlantic, where it enters the sea through a broad estuary. For about fifty miles inland, as far as the city of Limerick, the Shannon is navigable for large vessels. Many other rivers come down from the heights of Ireland, feed her multitude of lakes, and flow through the plains on their way to the sea — the Bann, the Foyle, the Erne, the Suir, the Blackwater, the Barrow, and others.

The rivers of Scotland are short and swift, surging down from the highlands to the North Sea or the Atlantic Ocean. Some of them empty into the firths, the long, fjord-like bays that were molded by the ice. All are rich in historic associations, and travelers from all over the world have been drawn to their waters, not by their beauty alone, but because of the memories that cling to them.

The principal rivers of Scotland are the Clyde, the Forth, the Tweed, the Tay, the Spey, and the Dee. The Clyde has its source among hills in the southern part of Scotland, where it is formed by the overflow from several burns, or tiny mountain lakes. It flows northwest through a hilly country, receiving several swift tributaries. There is a series of celebrated waterfalls where the river takes its course through a rugged gorge and plunges downward in graceful cascades. About forty miles above the place where it enters the Firth

*International*

The River Forth in eastern Scotland winding its way from Stirling Castle to the Firth of Forth. From an airplane one gets this remarkable view of the famous "links of the Forth." The river is actually 66 miles long, though the distance from its source to its mouth is only 30 miles.

of Clyde stands Glasgow, a great shipbuilding and commercial city. The Clyde, like the Thames and the Severn of England, has an estuary. This makes possible the sea commerce of Glasgow. Indeed, this world-wide commerce and the industries that have grown up along the banks of the Clyde, combine to make it one of the most important rivers of the world.

## CHAPTER EIGHT

### EROSION BY SEA AND RIVER

#### I. GROTTOS ALONG THE CAPRI COAST

ALONG the shores of Europe there are many places where waves gnawing at the rocks have made caves, such as Fingal's Cave on the island of Staffa off the Scottish coast, of which we have told you on page 92. The waves sometimes carve natural bridges too, where it happens that soft rock underlies a hard layer that does not yield readily to the wear of the water.

The most celebrated and beautiful of Europe's sea caves are on the island of Capri, at the entrance to the Bay of Naples. Loveliest of all these caves of Capri, and largest, is the Blue Grotto, where walls, roof, and sea are blue as the bluest sky. Visitors to this wonder spot go by steamer from Naples, but when the grotto is reached they must change to small rowboats. Even then they must lie flat in order to get through the low entrance, which is barely three feet high, and if the sea is a bit rough they cannot get in at all. But within, the roof curves to a height of forty feet, and many skiffs can move about there at the same time, for the grotto is a hundred feet wide and almost two hundred feet long.

The vivid blue light of this grotto is indescribable. At first when one goes into it, the light dazzles the eye. Not only do the walls, roof, and water look blue, but the faces and hands of the people and their clothes are bathed in blue light reflected from the water. Naked Caprese boys huddle on the rock shelves along the walls and offer to dive for pennies, looking like blue gnomes as they squat there trying to strike a bargain. But when they go into the water, their bodies have a silvery look. And the passengers



*Ewing Galloway*

Fantastic rocks off the coast of Capri, Italy, where the waters of the Mediterranean have been sawing away at the hard masses for countless centuries. It is easy to see where the waves found joints in the rocks and softer material that gave way under the continual assault of the sea.

in the boats find that their hands, as they trail them in the water, seem suddenly turned to silver.

On the coast of Capri near the Blue Grotto are several other caves made by the sea. There is the Green Grotto, where everything is a vivid emerald hue, and the White Grotto, beautiful as a fairy palace with its roof adorned with stalactites formed by the dropping of water from the limestone rock above.

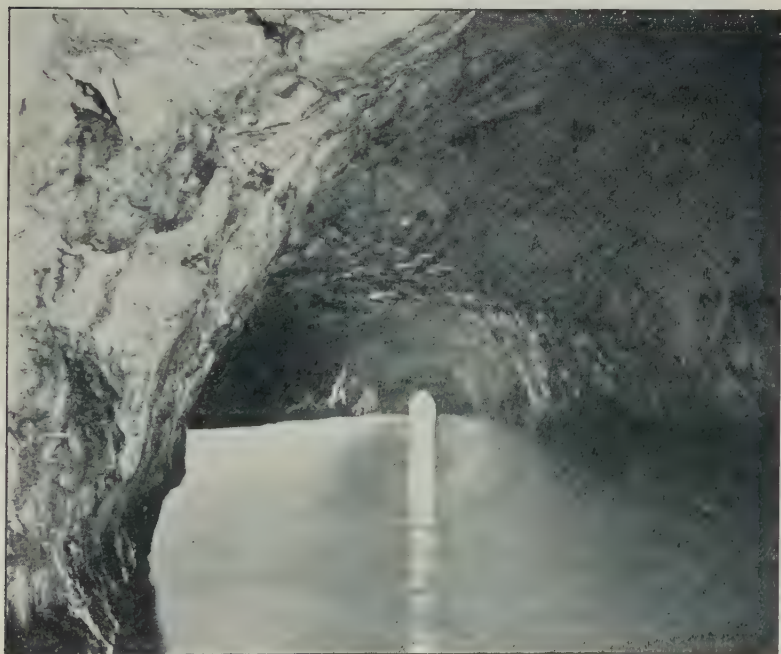
## II. CAVES MADE BY UNDERGROUND RIVERS

In sections of Europe where the rock is largely limestone, there are numerous caves and grottoes formed by the erosion of streams working their way underground, for limestone slowly dissolves in water. Some of the most noted of these



caves are in Italy near the head of the Adriatic, in a limestone plateau about ninety miles long known as the Karst. Some of the caverns of the Karst extend several miles underground, the largest and most celebrated being the Grotto of Adelsberg, a series of gigantic underground chambers more than two and a half miles long, formed by the river Poik.

As the stream cut through the limestone of which the plateau is made, it produced some very beautiful effects. The Grotto of Adelsberg consists of numerous chambers forty feet high and more, several of them being a hundred and fifty feet long. In one of these the water carved out

*Ewing Galloway*

The Blue Grotto, a cave in the rocky shore of the island of Capri, about twenty miles from Naples. The ancient Romans knew of this cave, but it was afterward forgotten until some one discovered it again about a hundred years ago. There is a strange blue light over everything in the cave.

arches and formed graceful, close-standing pillars that look like the pipes of an organ. This chamber is called the Cathedral. Another has a spacious floor and a roof beautified with long, icicle-like stalactites. The Ballroom is the name given to this great cavern apartment, and in it each year a festival called the Grotto Fête takes place. In another room the floor is piled high with stalactites that have broken from the roof and fallen below. Mixed with broken rock, they make a little hill within the chamber that the peasants speak of as Mount Calvary.

Besides these interesting and wonderful chambers in the Grotto of Adelsberg, there are numerous smaller ones, each weirdly beautiful because of the effect of its countless stalactites and stalagmites. This one cave alone is a little domain underground, large enough to hold more than a thousand people at a time.

In the waters of the Adelsberg Grotto are salamanders and certain other animals, all blind, as is the case with creatures that spend their whole lives in dark places.

A few miles from the Grotto of Adelsberg are the cascades and grottoes of St. Canzian. These are a succession of waterfalls and caves formed by the river Reka, cutting through two mighty walls of limestone, disappearing underground, coming out and again disappearing, until finally it reaches the Adriatic. None of the caves of St. Canzian is so large as the Adelsberg Grotto, but they spread over a region of several miles and, with the silvery cascades scattered among them, make one of the most beautiful and interesting sections of Europe.

In the southern part of Jugo-Slavia, along the coast, lies Montenegro. Until the World War changed the map of Europe, this was an independent country, but at that time the people merged with the adjoining state of Jugo-Slavia. The Montenegrins are of the same race as the Serbians, but their ancestors refused to yield to the conquering Turks and

established themselves in a region bounded by wild crags. There the sturdy people, poor and proud, remained separate and unvanquished for centuries. During the great war, the Austrians, aided by cannon, entered the country from the unprotected eastern border.

Montenegro is traversed by the same range of limestone mountains in which the caverns of the Karst were formed — the range that runs from Croatia down through Dalmatia to Albania. Scattered through them are numerous sink holes, depressions which contain most of the arable land in the little country. At some time in the past every sink hole was a cave, one that lay near the surface instead of far underground, and had for a roof a thin layer of rock. When the roof fell in, the cave became a sink hole.

One writer explains that "the barren dry limestone of the Dalmatian highlands, and of Montenegro also, has been aptly compared with a petrified sponge, for it is honeycombed with underground caverns and water courses into which the rainfall is at once filtered. Thus arises a complete system of underground rivers, with waterfalls, lakes, and regular seasons of flood. Even the few surface rivers vanish and emerge again at intervals, occasionally feeding springs at the bottom of the sea."

In the vicinity of Cetinje, the principal city of Montenegro, water from sink holes leaks down to lower levels and gathers to form the turbulent but shallow Rjeka, a stream which emerges from the base of a mountain wall to the south near the Albanian border. There it pours into the Lake of Scutari, a fine body of water about twenty-five miles long.

Farther north, out from under the mountain wall which crosses Dalmatia, gushes the river Ombla, like a mighty spring. This is not the whole story, however. High above, in the land of Herzegovina, lies a large lake which at times runs dry, for its waters sink and plunge through caves and

clefts in the mountain, afterward to flow forth as the broad, deep Ombla. Three miles farther down, this river slips into the sea at Gravosa.

### III. GREAT CAVERNS OF BELGIUM AND GERMANY

There is a superb cave in Belgium called Trou de Han (Hole of Han). This is at Han-sur-Lesse in southeastern Belgium, where the river Lesse flows right through a low mountain of limestone instead of running around it. The river, which long ago formed this great cave, has now dropped to a lower level and runs through another underground passage parallel to and just below the Trou de Han. Near the farther side of the mountain the dry older cave drops to the present level of the stream, which there spreads out in the darkness to form a small pond. Just beyond this place, the river bursts out into the light again.

The Trou de Han is nearly a mile long. It consists of a series of chambers, opening into each other and of various heights. All these chambers are very beautiful, the walls being heavily encrusted with stalactites, and in some places stalagmites along the floor give a weird fairy-land effect. One, called the Boudoir of Proserpine, has stalagmites and eroded rock masses that look like dressing tables, chairs, and couches. Another, fantastic and wonderful with its strange carvings made by the water, bears the name of the Throne of Pluto, for it is easy to imagine the gigantic, chair-like mass of rock as the seat of some underworld sovereign. Four splendid chambers, in which the most exquisite stalactites of the entire cave are found, are called the Merveilleuses — the Marvelous.

To the scientist, among the most interesting caves of Europe are those of Franconia, a hilly region in southern Germany, where there are numerous chambers made by underground rivers that have long since disappeared. In





*Ad Astra Aero*

Looking down on the Gorge of the Aar (lower right corner) from an airplane. The town of Innertkirchen lies in this high valley in the Bernese Oberland. If we could follow the course of the wild and foaming Aar up this valley, we should come to the magnificent Handegg Falls and, farther on, to Grimsel Pass.





*French Line*

Gorge of the Loup River, a deep and narrow ravine in the Maritime Alps. The automobile road winds back and forth as it climbs higher and higher, disclosing magnificent views.

these caverns have been found the bones of many ancient animals that lived in the caves, brought their prey there, and themselves afterward died there. In various museums throughout Europe are to be seen bones taken from the caverns of Franconia.

The most noted of these caves is near the town of Muggendorf. It consists of four stories, one above the other, and its chambers contain many remains of bears, wolves, lions, and hyenas.

These caves are all beautiful with stalactites, so numerous that they are often spoken of as the Stalactite Caverns of Franconia.

#### IV. THE GORGE OF THE AAR AND THE IRON GATES OF THE DANUBE

There are no gorges in the Old World comparable with the Grand Canyon of the Colorado and some of the other great gorges of America, yet Europe has several remarkable ones, the most widely known being the Gorge of the Aar in central Switzerland. Here the river Aar has sawed its way through a limestone barrier below forests of fir, larch, and pine, making a chasm through which the foaming water roars.

The carving of the Gorge of the Aar has taken a long, long time, not one or two centuries, but many ages. Little by little the stream cuts through, for there is no rock so hard that in time it will not be worn down by the unceasing flow of a river.

There are noted gorges along the Danube below Belgrade at the border where Jugo-Slavia and Rumania meet. Here in prehistoric times the river forced its way through the Carpathians. Through the narrow defile of Kazan it pours with a tremendous current, hemmed in by steep mountains. A little farther on, the river makes its way through the celebrated Iron Gates. In olden times this was a place much

dreaded by Danube boatmen, because submerged and projecting rocks made it dangerous to navigation, and because it was the haunt of brigands who used to watch for passing boats, sally out from their fastnesses, and rob them. Accounts of tragedies "beside the wild river cliffs," of those traveling on crafts that were wrecked or attacked by brigands, figure in songs and tales to be heard among the peasants throughout the entire lower course of the Danube. Within the last century, however, all this has changed. By a series of skillful blastings a famous Hungarian engineer has cut a deep passage through solid rock and has made the river channel safe for vessels. The retreats of the brigands have been destroyed too, so that now the voyage through the Iron Gates is as safe as along any other portion of the Danube.

France has some picturesque gorges, which, although they are on a smaller scale than the Iron Gates and the Gorge of the Aar, are worth knowing. A few miles back from the shore in the western Riviera is the Gorge du Loup (Gorge of the Wolf), a ravine about six miles long. This was cut by the river Loup, and its sheer banks are beautified by waterfalls where small streams plunge down into the larger one.

In the same neighborhood is the Cians Gorge, more than twice as long as that of the Loup, a gloomy, deep defile so steep and narrow that from the bottom of it in several places one cannot see the sky.

Still other gorges are scattered over Europe, in Germany, Austria, Italy, Belgium, and Scandinavia, all formed in the same way, by eroding waters.

## V. EARTH PILLARS OF EUROPE

Besides forming gorges and grottoes, the eroding waters of streams and of rain have done some other curious things in Europe. Near the town of Bozen, Italy, is a ravine

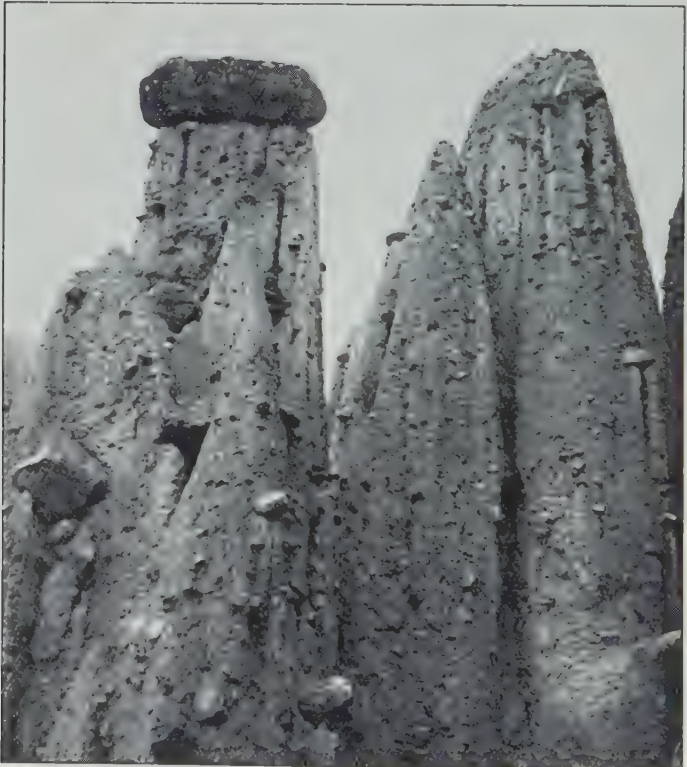
*Donald McLeish*

One of the strangest "high lights" of Europe. These earth pillars near Bozen in northern Italy show the work of the glaciers and of erosion during the centuries. The soft material left by the glacier has been washed away while these masses shaped like minarets have withstood frost and rain and all the work of erosion.

in which are so many spires and domes that it looks like a valley of castles. Some of these are tall and sharp; others are pyramids with broad bases and blunted tops; and still others are cones, often crowned with round, flat boulders. Here and there among them are some pillars so beautifully grooved or fluted that they seem to have been chiseled by a sculptor. These are known as the earth pillars of the Finsterbach, because they are found in the valley of that name, and they are among the world's most curious examples of erosion.

Once the ravine in which these pillars stand was a comparatively level valley. But it happened that the soil of

this valley was a hard red clay left by a glacier. In times of dry weather the soil cracked on the top. Into these cracks rain settled and carved openings between portions of clay. Gradually, during other rains, these masses of red soil became worn into pillars, cones, and pyramids by the action of the water. Where it happened that a stone or boulder lay on one of the portions between the cracks, the earth under the stone was protected from the



*Donald McLeish*

Earth pillars near Bozen. An ancient glacier deposited this moraine material. Then the storms and torrents wore away the softer parts, leaving these columns. The one at the left was protected by the rock lying across its top.



rain and not worn into needle-like spires. These stone-capped pillars look like grotesque old men beside the sharp points of the neighboring spires.

There are earth pillars in Switzerland also. Above Lake Geneva, in a picturesque glen near the village of Fiesch, are a number of curiously shaped pillars. One of these is so grotesque in appearance, because of six irregular boulders that surmount it, that it is called the Dwarf's Tower. This column is forty feet high and ten feet in diameter at its widest part. Some of the peasants of this region believe it was erected by dwarfs during the long ago. They declare that even now the little people hold it as their home, and that sometimes during the night there are strange dances and revels at its base.

## VI. FAMOUS WATERFALLS

High up in the Gries Pass on the Italian side of the Alps is one of the loveliest of all waterfalls, the Tosa, formed by a stream plunging over a high cliff. It makes a leap of four hundred and seventy feet, falling in three cascades to a high, flowery meadow above the timber line, and with its volume of clear, sparkling water is the most charming waterfall of the Alps.

A famous cascade of the Bernese Oberland is at Handegg, on the Aar River not far from its source. This is two hundred feet lower than the Tosa Fall, but is very impressive. Unlike the Tosa, which is formed of clear water, the current of the Aar is swollen with glacial clay and looks like soapsuds. Yet the Handegg Fall is one of the lovely sights of Switzerland, especially during midday, when the sunshine makes rainbows in its spray.

Besides these two large falls, there are a great many small, beautiful cascades in Switzerland — especially in the valley of Lauterbrunnen, where are the Staubbach, the

Schmadribach, and others about which we have already told you.

Lower, but much greater in volume than any of these mountain cascades, is the famous Rheinfall at Schaffhausen, in northern Switzerland, where the Rhine takes three leaps, plunging in all a distance of one hundred feet. It is strange that no mention of the Rheinfall occurs in history, although very much is said of the river. It is therefore supposed that the cascade did not exist until about a thousand years ago.

In the mountains of Norway are numerous masses of rock where a hard layer overlies a softer one, and streams flowing over these make some of the finest waterfalls in the world. Highest and grandest of all is the great Rjukanfos, or Smoking Fall (*fos* in Norwegian means fall), the most impressive in Europe. Here the swift, clear stream becomes narrowed and then suddenly plunges into a deep abyss flanked by black rock, from which the spray rises like a dense smoke. The Rjukanfos is nearly eight hundred feet high, far exceeding the Tosa, the highest cascade of the Alps.

On a branch of Hardanger Fjord is the splendid Vöringfos, formed by a swift river plunging into a chasm a distance of five hundred feet.

There are so many waterfalls in Norway that it has been said that every farmer has one on his land. Besides the Rjukanfos and the Vöringfos, there are numbers of high cascades along the western fjords. Above Hardanger Fjord a stream comes down from bare cliffs and plunges into the beautiful lake of Skjäggedal — not a hard word at all to the Norwegians. It means Shaggy Valley; and so Skjäggedalsfos is the Falls of the Shaggy Valley. It is the handsomest of all European cascades, falling from dark rocks sheer into a quiet mountain lake.

To the south of Hardanger are three superb falls that come down parallel with one another on the same side



*Wehrli, Ltd*

Gersbach Falls in Switzerland, above the Lake of Brienz in the Bernese Oberland. Between slopes of dark-green forests the river plunges from rock to rock, forming seven cascades.

of the road. On the opposite side descends another fine cascade, the four making a remarkably picturesque combination, as each one of them springs out of dark fir woods.

Sweden has a single famous cataract, not high, but broad



*Norwegian Government Railways*

Skaggedalsfos, "Falls of the Shaggy Valley," the handsomest cataract in Europe, which plunges straight into a beautiful mountain lake. In Norway one scarcely ever gets away from the sound of waterfalls.

and carrying a great volume of water. This is at Trollhätten, on the outlet of the great Lake Venern. In England and Scotland too there are waterfalls. Every girl has heard of the Doone River and the little cascade near Lorna's home, also of "how the water comes down at Lodore"; but these falls are so small that, if they were in Norway or Switzerland, they might have no names at all.



## CHAPTER NINE

### WOODLANDS OF THE OLD WORLD

#### I. THE FORESTS OF CENTRAL AND EASTERN EUROPE

##### THE ANCIENT FORESTS AND THOSE OF TODAY

EUROPE is a very old land, but the forests that we see today are relatively young. For many centuries wood has been needed there for fuel and to make homes for man, and during countless terrible wars wide tracts of woodland have been swept by fire and ax, so that the forests which covered much of this continent in ancient times have long since been cut away. With the passing of centuries, however, other groves have grown upon the sites of the ancient ones, and today many of the European countries possess great woodland wealth.

In the forests of Europe there are no gigantic trees, like the sequoias and redwoods of the California mountains or the giant Eucalyptus of Australia. The oaks, pines, spruces, firs, and larches are, for the most part, smaller than those in American woods as they are nearly all second growth, and the pines and spruces are of smaller species than those of our Pacific coast.

But because a great deal has happened in and around the forests of the Old World, they are rich in history and romance. They hold memories of conquerors of every age who have led armies through their green defiles. Under their arching branches, almost a thousand years ago, swept throngs of eager-eyed crusaders on their way to Palestine. They have gladdened also innumerable hosts of quiet, stay-at-home folk, who have sought recreation in the fragrant leafy spaces, and have been makers of health and happiness to people of all classes.

### THE BLACK FOREST

One of the most famous woodland sections of Europe is the Black Forest, or Schwarzwald, which covers the mountain country of Baden and large areas in Württemberg, in the extreme southwestern part of Germany. Until a few years ago the Schwarzwald was one of the noblest forests of the Old World. It was composed of fir trees, which grow luxuriantly in the fertile mountain soil, and their trunks used to stand so close together that one could hardly see the sky. That is why this forest came to have its name. All was dark and shadowy within its depths.

For a great many years the law required that for every tree felled in the Black Forest another must be planted.



*U. S. Forest Service*

A heavily timbered region in the Black Forest of Germany. The dense dark stretches of firs covering hillside and valley have given the region its name. The photograph shows (in the upper left corner) a small strip that has been cleared and carefully replanted with white pine and Douglas spruce from America.

Therefore, although a great deal of timber was taken out to be used in various industries, the replanting was so systematically carried on that this continued to be one of the great forests of the world. But since the Versailles Treaty of 1919 trees have been cut down there in such numbers to pay Germany's war indemnity that adequate replanting has been impossible, and today a large part of the ancient woodland is a sad reminder of its former beautiful self.

Clock making was the great industry of the Schwarzwald. It was there that cuckoo clocks originated, and there is a legend that the first one grew out of a boy's idea when he heard a cuckoo calling in the forest. The peasants of this region used to believe cuckoos could foretell events. As the men swung their axes during the summer, felling trees to furnish wood for their winter work, they would call, when they happened to see one of these birds, "How many years until I shall be rich?" or "How long will it be until my uncle comes back from the city?" And the bird would answer, "Cuckoo, cuckoo!" sometimes twice, sometimes half a dozen times, the calls representing the number of years that would elapse before the desired event.

One day, as a boy heard a bird answer, it occurred to him that a clock from which a cuckoo called the hours would be a treasure. He passed the idea on to his grandfather, the most skilled clock maker in the mountains, and they worked together in an attempt to carry it out. By the end of the winter they had made a cuckoo clock, which drew the first prize at the Easter Fair. Everyone who saw it wanted one like it, and all the peasants in the Black Forest began making cuckoo clocks. Word of the attractive timepieces spread beyond the mountains. Orders came in such numbers that the people had to work hard to fill them, and the boy's idea developed into a great industry.

In parts of the Black Forest near the large towns, the customs of the people are much like those in other sections



*U. S. Forest Service*

Silver firs in the Black Forest. All the crooked and defective trees have been removed. This gives the perfect trees a better chance to grow and also makes room for new young trees that will supply future needs.



of the world. They dress in the fashion of today, and the more prosperous ride in automobiles, instead of in the quaint, two-wheeled carts in which they went about in earlier days. But in the remote districts they live exactly as their fathers lived, keeping to the old ways, and caring nothing at all about adopting the customs of the cities or valleys beyond them. They dress in the fashion of a hundred years ago, transport their loads of timber and supplies in ox-carts, and



*Joseph S. Illick*

Marketing birch broom in Germany. The birch is one of the most useful of forest trees. Its flexible branches are used for brooms, and indeed every part of the tree is put to some use.

leave automobile trucks and high-powered cars to others. The women feel not the least bit uncomfortable in their wide, bright-colored skirts, tight-fitting black velvet bodices, and caps with frills and bows so wide they look like wings. The men think themselves very well-dressed in short coats, knee breeches, and low shoes bedecked with buckles. It was the costume of their fathers, and it is the costume they choose.

To the stranger who visits their village, it seems as if everybody had stepped back a hundred years and more. The



women bend to their spinning and weaving as they did in olden times. All day and all evening throughout the long winter the men are busy with their carving, clock making, and toy making — for large numbers of toys are made in the Black Forest — and at these tasks the boys and girls lend a hand. In these remote sections there are no moving picture shows, no radio sets, no talk of automobiles. Life is very much as it was in days gone by, when peasant girls thought with admiration and envy of fair princesses, and very likely fair princesses thought in the same way of peasant girls and would gladly have exchanged all their pomp and fine clothes for a taste of the village maiden's freedom.

#### THE BAVARIAN AND BOHEMIAN FORESTS

Woodland stretches very much like the Black Forest cover the low mountain chains of Germany, Austria, and Czecho-Slovakia. These too have been more or less ruined within the past few years because of the vast number of trees that have been felled to help pay the war indemnity.

In the eastern part of Bavaria running parallel with the Danube, is the Bavarian Forest, a stretch of many miles of pine and beech wood dotted with lakes and waterfalls. Here the same industries prevail as in the Black Forest — lumbering, clock making, and the manufacturing of wooden articles, kitchen utensils, and toys. And here, as in the Black Forest, the people are simple folk, satisfied with the ways of their fathers and grandfathers, and seeming to have no desire for the conveniences of life enjoyed by people in the cities. They dress in much the same picturesque way, and delight in telling legends of the supernatural creatures they declare haunt every lake and stream.

Adjoining the Bavarian Forest on the east is the Bohemian Forest, a mountain range covered with pine and beech trees and beautified by many tiny lakes and brooks. There one hears a great deal about Rübezahl, an elf who, the

peasants say, is the ruler of the many gnomes who haunt this woodland. According to the stories, old Saint Nicholas, during all the Christmas times he has been going around behind his reindeer, has not done more to gladden child hearts than this grotesque little fellow. He has led honest, kindly but unfortunate peasants to the spot where the treasure of fairy folk was hidden, and bidden them help themselves. And once, when an orphan girl was gathering pine cones in the forest in order to get enough fuel to keep from freezing, he changed every cone that went into her basket to solid silver. To this day, throughout the Bohemian Forest, children trim their Christmas trees with silver cones — cones their parents have painted and kept from year to year, as a tribute to Rübezahl, the great giver. Nobody ever sees the gnome king. He keeps himself from sight as completely as well-conducted fairy folk always have been known to do, but whenever a charcoal burner or woodcutter has an amazing stroke of good fortune, the peasants declare that Rübezahl has been near.

#### FORESTS OF THE CARPATHIANS, URALS, AND ALPS

In the Carpathian Mountains, along the border of Czechoslovakia and extending down through Hungary to Rumania, is some of the finest woodland territory of the Old World. Here the trees are not second growth, because this part of Europe was never so densely populated as the region farther west, and the demand for timber has not been so great. Giant trees hundreds of years old tower skyward, the largest evergreens to be found in Europe.

Among the Urals, in eastern Russia, are also some very old forests — cedars, larches, pines, and firs in the northern part of the range, while in the south groves of chestnut, oak, and other deciduous trees cover the lower slopes. These too are stately growths, showing what noble things trees can be when man leaves undisturbed the work of nature.



*Joseph S. Illick*

In a forest near Darmstadt in Germany. Here everything is clean and orderly. Trees are cut without waste, and the wood is carefully graded according to size and quality. Even the twigs and leaves are kept cleared up. Excellent roads extend through the forest.

The forests of the Swiss Alps are made up of evergreens on the higher slopes, with oaks and other deciduous trees along the portions skirting the lowlands. The Alps are so high that even the evergreen forests are far below the summits of the mountains. The Matterhorn, Monte Rosa, and the other Swiss giants rise thousands of feet above the tree belt, for in a region of perpetual snow not even pines can grow.

There was a time when there were woodland stretches in Greece, but today we find almost no forests there. This is largely because the Turks, who have overrun the country several different times, cut the woods away, perhaps not because they hated trees, but because they thought little of the future. This reason suggests itself because they have made a treeless region of every part of the world they have inhabited. Possibly they denuded the land of forests to get rid of wild animals. The Koreans, in eastern

Asia, destroyed their woods to clear out the tigers and leopards, and it may be that people in other districts have done likewise.

## II. THE FORESTS OF FRANCE

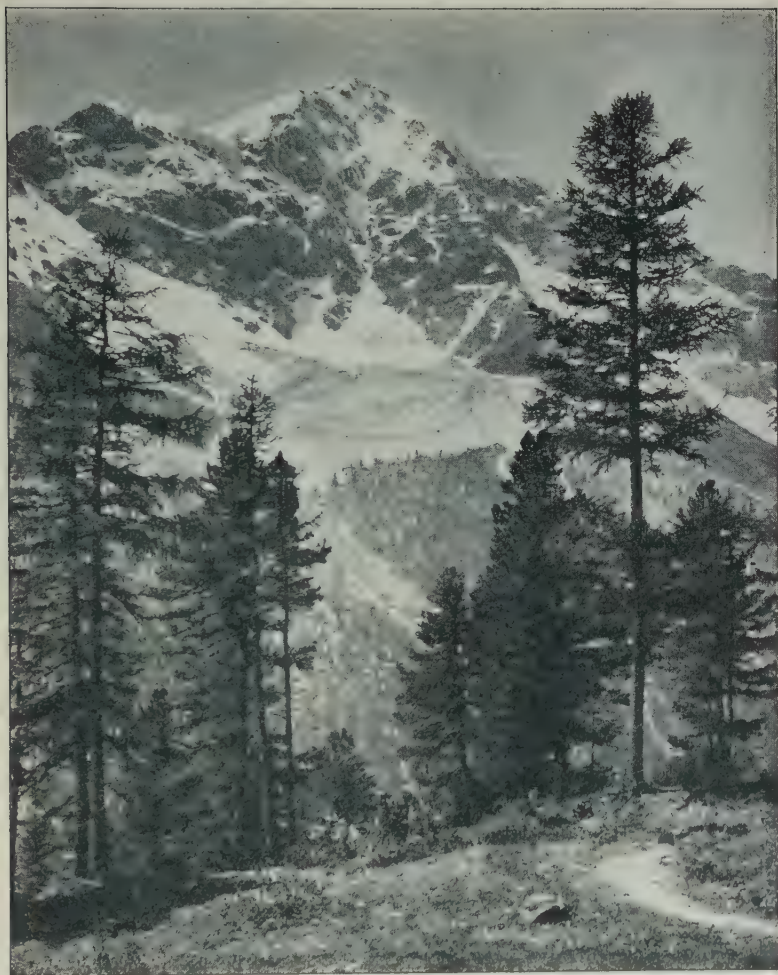
In the days when the land we know as France was called Gallia or Gaul, forests covered every mile of that country from south to north, and from the Mediterranean to the Atlantic. Two thousand years ago, when Julius Cæsar went through with his army, he found such a wilderness of trees that he wrote of it, "Nowhere are there to be seen such mighty forests as those of Gaul."

War and the needs of civilization caused almost all this noble tree growth to be destroyed, but other groves were planted to replace many of those that had gone down under flames or axes, and today France has many splendid woodland stretches.

The forests of France are of two kinds: those of the lowland, where the trees are maples, beeches, chestnuts, oaks, and elms; and those of the mountains, which are chiefly evergreen. Each is equally valuable to the country. The World War made pitiful wreck of much of the wooded region of northeastern France, particularly in the Vosges Mountains, where there were some beautiful forests. Already steps are being taken to repair the damage, and in time the devastated section will be reforested.

The most famous of the forests of France is that of Fontainebleau, southeast of Paris, where, carpeting a region of sandstone rock about fifty miles in circumference, are magnificent maples, beeches, elms, oaks, and other deciduous trees. It is a paradise for birds, squirrels, rabbits, and small game, and a favorite vacation place of people from the capital. The river Seine bounds Fontainebleau on the northeast. The forest is broken by numerous wild gorges, and in several parts of it are quarries, from





*Donald McLeish*

Tall evergreens, survivors of the forests that once flourished on the mountain sides up to the barren region of snow fields and bare rock. Deciduous trees — oak, beech, ash, and sycamore — grow on the slopes of the Alps, often as high as 5000 feet on the southern sides. The magnificent mountain in the picture is the Ortler, one of the highest peaks of the Tyrol and the eastern Alps.



*U. S. Forest Service*

A stretch of European oaks in the forest of Fontainebleau. It is impossible to show in a photograph the charm of these woods, one of the most famous and beautiful places in France.

which stone is taken to furnish paving blocks for the streets of Paris.

The Forest of Fontainebleau is part of what was once the estate of King Louis VII, who lived almost eight hundred years ago. He built a fortified château and spent most of his time there, and the great woodland stretch was his hunting preserve. As centuries passed, the stronghold gave way to a palace that still stands, and in the forest succeeding kings of France and their nobles stalked the deer.

When the days of kings ended in France, Fontainebleau became a holding of the French republic, and so it remains, carefully protected from the woodman's ax and the pride of the entire country.

Within the Forest of Fontainebleau many of the great artists of France have found inspiration for their work.

Here painted and dreamed Millet, who gave to the world "The Angelus" "The Gleaners," "The Man with the Hoe," and other famous pictures; Corot, who delighted to paint trees and gentle landscapes; Rosa Bonheur, maker of canvases in which animals seem to come to life, and many another master of brush and pigments.

Far in the southeastern part of France, where the Maritime Alps come down to the sea, is the forest of the Estérel. It begins to the westward of the city of Nice and extends along the shore and inland among the mountains. This is a wilderness of pine trees rising above rocky hills and slopes of bright red rock. In some of the valleys away from the coast are groves of cork oak, and the gathering of the bark for commerce is an important industry. But mostly the Estérel is a forest of evergreens.

This woodland stretch takes its name from a nymph, Esterella, who in the olden time was believed to haunt these mountains. She was marvelously beautiful, like the Lorelei of the Rhine, whose golden hair and radiant face caused boatmen to forget their oars and go to death below the rock upon which she sat. But Esterella never remained still long enough to comb her hair. Fleet as the wind, she darted up and down the cliffs, pausing to drink at some brook or waterfall. Then away again through craggy glens and across sheer slopes she went, singing a weird, entrancing melody. If any charcoal burner, cork gatherer, or hunter chanced to see her, he forgot home, friends, work, and everything else and sped in pursuit of her. Around fire-sides in southeastern France many tales are told of those who left the village in the glow of youth and became wild creatures of long matted hair and naked bodies, and changed from young men into old in trying to overtake the nymph of the groves and mountains.

On the higher slopes of the Pyrenees, on both the French and the Spanish side of the mountains, spruces, larches,

pinces, and cedars abound, and farther down are the oaks and chestnuts of the valley. The trees of the Pyrenees are not so large as those of the Carpathians and Urals, but are like those of the Black Forest and Bavarian Forest, where the woods have been harvested and replanted many times. They make a beautiful wilderness, however, a rich possession for any land.

In northern France and southern Belgium there is a wooded hilly region in which chestnut, maple, oak, and elm trees abound. This is the Forest of Ardennes, in ancient times the most extensive wilderness of western Europe. It is still an important woodland, although small as compared with its former size, and much broken by stretches of cleared land in which are numerous towns and villages.

In the days of Emperor Charlemagne, the Forest of Ardennes was believed to be a favorite retreat of a miraculous steed named Bayard. According to tradition, this fiery, intelligent creature was a gift to the knight Aymon from a wizard and possessed all sorts of magical powers. Aymon gave Bayard to his four sons, who could all ride him at once, because he had the remarkable faculty of lengthening himself at will, in telescope fashion. When Aymon died and his holdings were divided among his children, his castles and lands fell to the three older brothers. But Regnault, the youngest, received the steed, and horse and master loved each other with great devotion.

Many wonders are told of Bayard. Very often by his miraculous powers he saved his master from death. The account of the adventures of Regnault and Bayard make up one of the great poems of the Middle Ages, and among the Belgian peasants there are some who still believe that every event described in it actually occurred. Bayard never died, they say, for neither sword nor disease could kill the enchanted steed. He still roams the Forest of

Ardennes, and on almost any summer day men working or hunting far in the woodland depths can hear his neighing.

Besides figuring in tales of the Middle Ages, the Forest of Ardennes has been the theme of many a writer of modern times, because within it has occurred much that has gone to make history. The battle of Waterloo, where Napoleon was defeated by the Duke of Wellington and his allied army of British, Dutch, and Germans, was fought in what had been a portion of the ancient Forest of Ardennes.

And Ardennes waves above them her green leaves,  
Dewy with nature's teardrops, as they pass,  
Grieving, if aught inanimate e'er grieves,  
Over the unreturning brave — alas!  
Ere evening to be trodden like the grass.

Thus wrote Lord Byron of those who went to the field of Waterloo, but did not return from it.

### III. SHERWOOD FOREST

In the central part of England, in the county of Nottingham, is the most celebrated woodland of the British Isles, Sherwood Forest, made up of giant oaks and beeches, and famed in history and legend as the haunt of Robin Hood and his Merry Men.

Robin Hood was not the kind of outlaw who holds up a train or kills people in order to make himself rich. Tradition says he was a British noble, the Earl of Huntington, who had been unjustly deprived of his estates by a tyrannical sovereign. So he defied the king and fled to the greenwood, where he soon had a considerable following.

A care-free, reckless lot his Merry Men were — Little John, Allen-a-Dale, Will Scarlett, George-a-Green, and several others, and Maid Marian, the only woman among them. They robbed the rich in order to help the poor, or, rather, took from the rich what had been obtained from the poor



*U. S. Forest Service*

Ancient Spanish chestnut trees planted about 250 years ago, part of a fine avenue of chestnuts in Greenwich Park, London, laid out in the time of Charles II.

by tyrannizing over them, and gave it back where it belonged. Robin kept always within the forest except on May Day, when archery contests and games were held on the green at the town of Nottingham. Then usually he fared him there, and as he was the master bowman of all of Merrie England, amazing things happened.

The story of Robin Hood has been told and retold in books both of today and yesterday. It has been made into an opera and pictured on the screen, and it is a tale boys and girls never tire of hearing. So the name of Sherwood Forest is often upon the tongues of young people who talk about the hero of the greenwood.

Sherwood Forest is still a beautiful woodland, sheltering birds and squirrels as it did in the days of Robin Hood,



when it echoed to the sound of singing bowstrings. Though much smaller than it was then, it is still the largest and finest forest of England.

#### IV. WOODLANDS OF SCANDINAVIA

The slopes of the mountains of Scandinavia are largely covered with fir, pine, and spruce, birches and willows. In Norway the forests are confined chiefly to the southern parts, but Sweden has vast forest areas throughout much of the unsettled regions of the country. Above the timber line grow willows and dwarf birches, tiny treelets that are full grown, yet not more than four or five inches long, and lying flat on the ground.

The birches of Europe make an interesting study. In the north temperate zone, in Germany, Belgium, the British Isles, and other countries of the same latitude, there are many of these trees of goodly size, reaching a diameter of a foot or more and a height of fifty to sixty feet. But as one travels north and away from the sea level, with increasing cold and shortened summers, one finds birches of other species growing smaller and smaller, until they are only a few inches in height.

Each of the dwarf birches has three or four leaves, and in the curve of the uppermost leaf is a little catkin of flowers, which blossom in July, the month in which there is no darkness, even at midnight, in Norway. These tiny treelets drop their foliage and close up all business with the snows of the first of August.

With the birch one finds dwarf willows standing a foot high, and along the cliffs different kinds of heather, very small in size, but joyfully putting forth bloom in July. In this far northern region it takes the entire month of June to warm up the land sufficiently for the blossoming of flowers.

Above the forests of dwarf willow and birch are the

great reindeer pastures. These are tracts of land covered with reindeer moss, a dry, harsh lichen of which the reindeer are very fond. This moss is tasteless and unpromising as a food plant, but as it is tenderer than the stunted birches and willows, the only other thing the herds have to eat, they devour it with great relish.

## V. PROTECTION OF THE FORESTS

Besides the forests about which we have told you, other woodland stretches are scattered throughout Europe. All the mountainous regions were formerly densely wooded, and among most of them is still some forested area. That there is any woodland whatever in either the mountains or the lowlands of Europe is due largely to the fact that in most regions the people have come to realize the value of trees and have learned to treasure them. In some countries it is necessary to obtain a government permit before one can fell trees even on his own property, and in Sweden, where an effort is being made to reforest with oak, it is a prison offense to cut down an oak tree. This seems a severe law, but sometimes such measures are necessary because of the many people who do not think beyond their own desires and needs. A man's acres belong to him during his lifetime, but they will belong to someone else after he is gone, and through thoughtlessness or selfishness he ought not to impair their value to those who succeed him. If man will work hand in hand with nature, even regions that are bare of trees now can be made into sweeps of green aisle and leafy space that will be a source of benefit and pleasure to generations yet to come.

PART TWO  
LIFE UPON THE EARTH



*American Museum of Natural History*

Bear hunting in the days when stones were the most effective weapons. Men and wild beasts both lived in caves. (From a painting by Kuhnert.)

## CHAPTER TEN

### CREATURES OF THE WILD: A STORY OF ANIMAL LIFE

#### I. ANIMALS OF LONG AGO

BEFORE man appeared in Europe, wild beasts dominated the unbroken woods. Ere they came upon the scene, however, when Europe was not yet established as a continent but was mainly a cluster of islands, their ancestors and far-off cousins lived there, and these were often very different from the wild creatures of today.

During the long Mesozoic Age lived the huge reptiles. They were the highest forms of animal life at that time and they existed in great numbers and variety. Some were lizard-like in form, reaching a length of eighty feet. Others, like cows and even larger than a cow, stood up, browsing on branches of trees. Still others swam like whales in the sea, some of them with short necks and some with very long ones. Then there were also small animals which flew in the air with wings like bats. The first birds came in this age; they were lizards with feathers instead of scales, except on their legs. They had long, slender tails and long jaws with sharp teeth instead of a horny beak without teeth, as is the way with all birds today. None of these strange and huge reptiles are now living, their place being taken by smaller forms — turtles, alligators, lizards, and snakes.

Following the period of reptiles came the Tertiary Age, the age of elephants and other large beasts of more modern type. There were small animals also, but so many elephants and elephant-like animals — hippopotamuses, rhinoceroses, and beasts with great, curving tusks — appeared during this time that it was truly an age of elephants. There was the mammoth, a large elephant with hairy skin; the mastodon, with body and tusks much like the elephant but with



very different teeth; and the urus or aurochs, a great ox with large horns and a ferocious disposition, the wild ancestor of our much smaller domestic cattle. This monster roamed the forests of Gaul for many centuries and was there as late as two thousand years ago, when the Romans under Julius Cæsar came northward on their march of conquest.

During the time of the elephant-like creatures, there were saber-toothed tigers and cave bears, beasts larger and fiercer than grizzlies. There were hyenas and giraffes also, wild boars and great deer, and in the British Isles the huge Irish elk, much larger and more powerful than the moose, the largest member of the deer family living today. It was in the Tertiary Age that the ancestors of the horse we know



*American Museum of Natural History*

The brontosaurus, a huge reptile which swam in the seas in the Mesozoic Age. (From a painting by Charles R. Knight in the American Museum of Natural History.)



*American Museum of Natural History*

A woolly mammoth, one of the great animals of prehistoric times. It bears a strong likeness to the elephants found today in the wilds of Africa and Asia, differing mainly in the long hair and upcurved horns. (From a painting by Charles R. Knight in the American Museum of Natural History.)

today migrated from America to Europe across some land connection that disappeared before historic times. Later, in the ice ages, the horse disappeared entirely from America but lived on in Europe.

Just how long the great creatures of the past prowled about the fields and forests no one can tell, but finally they passed away. Some of them left descendants much like themselves, but others were utterly exterminated.

We know how these animals looked, however, because in the caves that were their lairs, they left their bones when they died. Ancient animal remains have been dug out of the ground in almost every European country, but the caves have been the most instructive cemeteries of the past that have yet been opened. Embedded in the earth in these underground lairs, have been uncovered bones of lions, hyenas, reindeer, bison, mammoths, and other creatures that roamed the fields and forests of Europe during the long ago.

## II. WILD ANIMALS IN EUROPE TODAY

Although today we see no more the gigantic animals that lived during the Tertiary Age, the animal and bird life of Europe is still very interesting. Both in the mountains and in the lowlands are beautiful wild creatures, each species of which is well worth knowing, each getting its food in its own way and living according to the habits of its kind.

High up among the Alps and in the Pyrenees, the Carpathians, and the mountains of Austria lives the chamois, a graceful, fleet-footed little creature with mild, appealing eyes and skin of a rich brown color. The highest and steepest ridges are its favorite haunts, and it is so swift and sure-footed that only the most agile hunters can reach its home. The chamois feeds on plants that grow on the heights, coming down only to search for food and to escape the storms. Even then it is not easily taken by hunters because it runs very fast, climbing the steepest cliffs and leaping over crevasses, where man finds it very difficult to follow.

The chamois was once abundant in Europe, but because of much hunting its numbers have dwindled until now there are not many left. Part of this destruction has been due to the demand for chamois skins for commerce, to be made into gloves and to be used in polishing gold and silver ornaments and highly finished woods. But chiefly it has been brought about by those to whom the chase is just a game, not a means of livelihood — by men who, wantonly and heartlessly, have destroyed beautiful life. The animals of the recent forests of Europe were much like those of the eastern United States, but because of the hunting and the clearing of the forests, their ranks have been thinned in even greater degree than with us.

In the wooded regions of Europe there are still a few deer. In olden times these animals were abundant there, but



*American Museum of Natural History*

The Irish elk, one of the magnificent animals that have disappeared from the face of the earth. It lived in the British Isles in the Tertiary Age and was similar to the moose of today but much larger.

unchecked hunting has almost killed off the species. For centuries stalking the deer was the sport of royalty, and almost every king devoted a part of his time to hunting. A poem of the Middle Ages says that William the Norman "loved the tall deer as if he were their father," which means he loved to see them in his parks and forests, and loved also the sport of pursuing them when he rode to the chase. It was left for his far-off descendant, William II, Emperor of Germany, to hunt the "tall deer" without riding in pursuit, standing at a gate and shooting down tame ones as they were driven through.

The giant deer of Europe which appears most often in story is the stag, a near relative of the one to which in America we give the incorrect name of elk. There were formerly large herds of stags throughout the British Isles.



The true elk, which in America we call moose, one of the noblest beasts that ever trod the earth, was once common in the forests of northern Europe, but now, outside the wildest districts of the north, it is seldom met.

In the days of the cave man the aurochs was plentiful in Europe. Until recent years it ran wild in some numbers in the woods of Lithuania to the north of Poland, where it was protected by the government. But now even these herds have been killed off, and we know the aurochs only through its tamed descendants.

The buffalo of Europe is very different from the bison, called "buffalo" in America. As a wild animal it is nearly extinct, but the domesticated buffalo may be seen any day in southeastern Europe, in the Balkans, Greece, and Macedonia. It is a small, cow-like beast with big horns, curiously bent back over its neck, and with cold blue eyes. It has an expression that seems to indicate disgust at being forced to labor at drawing carts and plows. One of the signs of war in Macedonia is the sight of a woman leading a buffalo attached to a plow, while another woman handles the plow. This means that the men are away fighting, and the entire burden of the farm work falls on the women.

In Greece, Macedonia, and Turkey one meets camels now and then, for there, as in Arabia and Egypt, they are beasts of burden. A camel is hardly a domestic animal, because he has never been tamed but has simply been enslaved. A beast has to be wild before it can be tamed, but a camel has so little spirit he cannot really be called wild.

There are racing camels, known as dromedaries, that have a great deal of speed and are valuable to the Arabs and Turks of the desert. The ordinary camel, in spite of his strength and endurance, has little intelligence, much less than a horse or an elephant. Once started on a road, he will go straight ahead, no matter what is in the way, crowd-



*E. R. Sanborn, N. Y. Zool. Soc.*

The stag or red deer of Europe, praised in Scott's *The Lady of the Lake* and in many other classic writings. It formerly roamed in herds through the forests of the mountainous parts of Europe, but is now rare except in the Highlands of Scotland, where it is preserved in deer parks.

ing through hedges, fences, or gardens without turning to right or left until he meets a house or some obstacle so great he cannot tramp through it. A long train of loaded camels can be led across the country by a little donkey, to which the first camel is tied. The donkey, with a keener brain, knows when to turn. When he takes the lead, the camel train follows, and the driver need not worry or even follow closely, until the time comes to unload. A caravan of camels passing along gives one the impression of being far away in Bible times.

Among the uplands of Norway, far up in the region where the dwarf birches grow, lives the reindeer, feeding on the reindeer moss of the great northern mountains. He is much like the caribou of the open lands of Canada, with flattened,

wide-spreading antlers and a powerful head and body. His legs are strong and his broad feet keep him from sinking in the snowdrifts as he moves swiftly across the country.

There are bears and wolves too in the wilder regions of Europe. The bears are similar to our grizzly and are no doubt descended from the cave bear of the Tertiary Age. Along a few of the woodland streams beavers may be seen industriously at work building their lodges. Squirrels are still found in the forests from the British Isles to the Balkans, and throughout this region there are also foxes, rabbits, and lynxes.

### III. THE BIRDS OF EUROPE

The birds of Europe are, in general, like those of the United States. The species are, however, mostly different, and some have different names even in England. The mavis, a sweet-voiced singer, has figured much in the poetry of the British Isles. It is a European thrush, and has relatives throughout the United States.

A bird like our robin is in Europe shining black, and goes by the name of blackbird or merle in England. None of the American blackbirds or their cousins, the orioles, bobolinks, and meadow larks, are found in Europe at all. The English redbreast, another bird popular with the poets, is a cousin of the American bluebird.

All these birds and many others — warblers, finches, and nightingales — nest in the north and escape from the snow by migrating to Italy, Spain, and Africa.

Throughout Europe is found the cuckoo. Unlike our two American species, the European bird builds no nest but lays its eggs in the nests of finches and other small birds, and when the young cuckoos are hatched, they soon expel their weaker foster brothers.

*Lee S. Crandall*

The mavis or song thrush, a European bird, whose sweet song is heard in garden, meadow, and woods.

The marten, a small black swallow, is common in Europe as in America. This bird, the Black Forest toy makers say, is an unfailing weather prophet. Always he knows to the day when winter will begin, and flies away to the warm southland to avoid getting his toes frozen. Our robin sometimes makes a mistake and comes back too early in the spring, and other migrating birds do the same. But the marten, they declare, is never fooled. Just as surely as Christmas comes on the twenty-fifth of December, so will warm days begin when the marten returns to his nest in central Europe.

A delightful Old World bird is the skylark, of a mottled brown color. He is not especially beautiful but has a cheerful voice, and from early times has been a favorite with the poets. He soars up swiftly to a great height, singing joyfully as he goes. His song can be heard when he is so far above the earth that he is just a shining spot against the sky. The skylark never ascends by circles, as some birds do. As one writer says, "He mounts up like a



*Lee S. Crandall*

The European jay, quite different in appearance from the American bluejay, but just as selfish, noisy, and restless.

human aspiration," while he "shines and sings." He comes down, as he ascends, suddenly, swiftly, like something dropping from the clouds. And he sings, too, even as when he is rising.

How far he seems, how far!  
With light upon his wings;  
Is it a bird or star  
That shines and sings?

It would seem that so delightful a bird as the skylark would be carefully protected. In some European countries he is, but unfortunately not in all. His little body has a spoonful of delicate meat, and every year thousands of skylarks are killed to make food for greedy people. It is an evil practice that began centuries ago with gormandizing kings, who liked the idea of having "four and twenty black-birds baked in a pie."

In those old days common people were not allowed to eat larks, and, since there were not so very many kings, they could be fed without destroying great quantities of birds in a

year. But it set an unfortunate fashion. The time came when the people demanded delicacies that in the past had been enjoyed by the great folk only, and countless numbers of larks were killed each year. A few years ago in London there was published an account of the death of a veteran pot hunter who had but one claim for remembrance. During his lifetime he had trapped forty thousand skylarks, which he sold for a penny apiece in the London market.

In some lands men and women who know what the destruction of bird life means have succeeded in getting laws passed to save the helpless flying things from the tables of the greedy. But with the changing seasons the birds migrate south and cross countries where there is no protection for them, and there they get into traps or are shot down in great numbers.

This happens especially in Italy, lower Egypt, and the south of France. Most of the central and northern European lands have passed laws protecting birds, but Italy has not. As each autumn flying flocks cross the Alps, the Italian peasants set traps for them, with the result that thousands of those that started on the long migration are destroyed before the season is over. Because of this practice the bird life of Europe is rapidly dying out, and as the birds disappear the insects on which they feed become more numerous and destructive.

Some years ago Dr. Jordan appealed to Professor Paul Sarazin of Basel, president of the Bird Protection Society of Europe, to find out what could be done to put an end to the destruction of birds that cross the Alps. But Sarazin said it was practically impossible to do anything. They are never safe when they cross the border into Italy. Although Switzerland has strict laws governing the killing of birds, and is careful about enforcing them, the slaughter of feathered life goes on unchecked in the Swiss canton of Ticino, where the population is Italian.



The most celebrated bird of Europe is the nightingale, because its song is exquisitely sweet. Although widely distributed over Europe, it is found chiefly in Italy, where it was once abundant. Throughout spring and early summer the delicate tones of the nightingale sound through the groves and thickets. It sings especially at night, and from that habit comes its name. This little bird, rusty brown in color with flecks of olive on the body, is plain-looking enough. But what it lacks in appearance it makes up in song, and in poetry it has a larger place than any other bird. For centuries poets from Persia to Spain have written in praise of the sweet music of the gentle nightingale. The old idea was that this bird sings always to the rose, probably because its notes are heard most often during the summer months.

A very interesting European bird is the stork, a long-legged creature like a heron, with feathers of pure white and black, and legs and bill of vivid red. Its brilliant coloring makes it very striking, especially when seen against green grass or trees.

The stork is one of the most friendly of birds. Some birds keep away from people whenever they can, but the stork is not one of them. It makes its nest commonly on the roof of a house and returns year after year to the same home. Curious structures are the nests of storks, built out of sticks and mud. They are common in the lowlands of northern Germany, Holland, and Denmark. The birds stay there throughout the summer time, and the peasant who has storks nesting on his roof counts himself lucky, for good fortune is supposed to come to him whose home is chosen by them. To kill a stork is regarded as a crime that is sure to bring misfortune. This belief of the peasants protects these birds as securely as the strictest laws would protect them.

Storks feed on insects gathered in the pastures and on



*Ewing Galloway*

A stork perched on its nest in the Spreewald district of Germany. This bird is always a welcome tenant wherever it chooses to build. It is an unusually large bird, with long bare legs like a heron, and stands more than three feet in height.

frogs from the ponds and streams. They are especially fond of frogs and are often seen hunting for them along the water's edge.

In autumn the storks fly southward over the Alps and across the Mediterranean to Africa, and they make great preparation for their migration. They gather in groups at the nests, chattering continuously, and whenever this happens the peasants know they are getting ready to set out. Soon afterward they go, each group flying over the same route from year to year. We know from history and from old records still to be seen in Italy that the stork migration follows the same route now that it followed centuries ago.

There are many other kinds of birds in Europe, too many for us to name or describe. In the fields and deciduous forests are bullfinches, goldfinches, warblers, and chatterers, with several kinds of sparrows. In the pine woods live the crossbill and the grosbeak, a large, handsome, sparrow-like bird, bright red instead of brown, and with "songs like legends, sweet to hear." But unless every country passes and enforces laws to protect them, they are sure to die out, so that people of the future will merely read of the extinct feathered creatures of the past, instead of enjoying their song and delighting in their plumage.

## CHAPTER ELEVEN

### FROM SAVAGERY TO ENLIGHTENMENT: A STORY OF EARLY MAN IN EUROPE

#### I. MEN AND WOMEN OF THE STONE AGE

THE people of Europe all belong to the white or Caucasian race, yet as we meet those of the various European countries we find that they do not look alike. The Swedes and Norwegians are very different in appearance from the Italians, and the men and women of Switzerland are very unlike the Danes. Those living in the south for the most part have dark, olive complexions, while the northern Europeans are usually blue-eyed, fair-haired, and of light complexion. All are members of the white race, but they belong to different branches or families, each having its own peculiar characteristics and appearance.

There are three main branches of the Caucasian race in Europe — the Alpine, the Mediterranean, and the Nordic. The first comprises the stocky, broad-faced tribes native to the Alps and the Pyrenees; the second, the dark-haired peoples around the Mediterranean Sea and extending irregularly into other regions; the third, the tall, blonde tribes of the North — Scandinavian, British, Germanic, and their relatives wherever found. In the beginning they may have come from the same stock, but because they settled in different localities and had no contact with one another, in time they grew to be different in appearance, habits, and characteristics, until each became distinct from the others. In many regions, however, the various branches are now much mixed, and there are few which can be called absolutely pure.

The divisions which set apart the Europeans are old, for it was very long ago that they developed into three distinct branches. But farther back, it is thought, the negro



*American Museum of Natural History*

A scene in the times of the cave men. The heavy club, the stone implements, and the animal skins show something of their way of living. From skeletons found in caves scientists have learned that these early men were short and powerfully built. The figures in the picture represent a man and a woman of the Neanderthal race. (From a painting by Charles R. Knight in the American Museum of Natural History.)

tribes of Africa and the Mongolians of China developed into a people quite different from the Caucasian races. And still farther back there may have been races of men who are now extinct.

It is not certain where mankind originated, but some authorities think it was in central Asia or northern Africa.



Very likely the earliest men were divided among nomadic tribes of the plains and deserts, and home-making tribes of the forests and caves. Man grows up very slowly as compared with animals. The young fox or dog is a baby for just a little while and can soon take care of himself. But the child of the human race is dependent upon his mother for several years. During this time the father must in some degree care for both mother and child. Should father or mother habitually fail, the race would disappear. This long period of infancy of human beings made home-making necessary, and so we find that the more man advanced toward civilization, the more of a home-making creature he became.

The first human beings must have looked rather different from those of today, and from remains that have been dug up we know they were not much above the higher animals in intelligence. Remains of a very early human being, known as the Piltdown man, were found in 1912 in a river drift in Sussex in southern England. He seems to have been a low-browed, heavy-jawed fellow of dull mind and clumsy ways. The scientists have to build up their ideas of his nature from a study of his skull.

Another low-browed, heavy-jawed race with thick eyebrows is represented by the Heidelberg man, found near the city of that name; and still another is represented by the Neanderthal man, found in a valley of the Heidelberg region.

Later than all these, many thousands of years ago, there came from Asia to Europe the relatively civilized race called Cro-Magnons. These people had a well-developed brain and body, and showed artistic qualities which raised them far above the primitive races who preceded them. Some scientists think that the people who inhabited the Grottes de Jonas among the volcanic mountains of Auvergne, where they dug out little caverns for homes, were descendants of the Cro-Magnons.

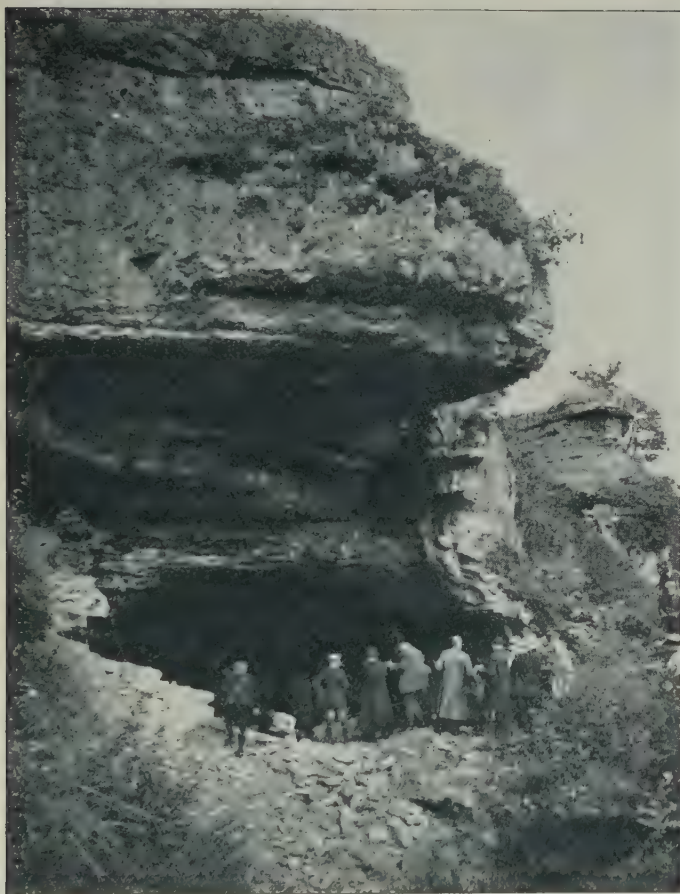
Because many of the earliest men made their homes in caves they are called cave men, and the time in which they lived is known as the Stone Age, for they used stones for weapons and for making various implements. They clothed themselves with the skins of animals. Their food consisted of game and of roots and berries gathered in the fields and woods, all of which they ate raw. The Stone Age may have begun over a hundred thousand years ago, even before the times which geologists call the Pleistocene Period.

Life in those days was neither comfortable nor safe. There were many huge, ferocious animals—cave bears, saber-toothed tigers, wolves, and the like—and man had to be constantly on his guard against them. In the very early times his only weapons were clubs and stones which he hurled by hand.

As he struggled to defend himself against animals and to kill them for food, man found it necessary to have more effective weapons than rough stones and wooden clubs. He took to sharpening flints and turning them into knives and spear tips by chipping them with other stones, and gradually through practice he became more skillful at doing this. Little by little he formed better and better implements.

After a time, the prehistoric European discovered that the bones of the creatures he killed could be made to serve him as weapons. He began carving implements out of the skeletons of animals. He made long, slender, sharp-pointed needles for sewing skins together. Thongs of hide and sinews of deer served as thread.

As very slowly the cave man grew toward civilization, he learned to form a crude kind of bow and arrow and to shoot with it. So now he made arrowheads of flint or bone, and became more successful as a hunter than he had been before. He learned to value flint especially for the tips of spears and for arrowheads.



*George Grant McCurdy, from "Human Origins"*

The Cave of Le Placard in southwestern France, to the north of Bordeaux. Cro-Magnon people lived in this cave in prehistoric times. From relics discovered there, scientists have learned something of the life of this ancient race.

This improvement in the condition of the early people seems very slow to us, yet even this slight change for the better took a long, long time. Many centuries passed before the cave-dwelling hunter learned to make bows and



*American Museum of Natural History*

The simplest kind of implements made from bits of flint or stone by primitive men of the early Old Stone Age. The tools in the upper row were used for chopping, cutting, and scraping. Those in the lower row show more careful shaping. Taking them in order from left to right, they were used as hammer, ax, saw, dagger, and arrow point.





arrows. Compared with his ancestor, whose only means of bringing down his game was to throw stones at it, he was quite advanced. It has taken countless years to develop the races we know from these ancient people.

In some way prehistoric man discovered that fire was a thing that could be made to serve him. He found it would give him comfort when days and nights were cold. He learned too that food roasted on coals of wood was pleasanter to the taste than the raw meat, roots, and berries that had made up his meals and those of his ancestors. The very early human beings feared fire as animals fear it, but as time passed, man began to see that it was a friend to him. He obtained fire, as the Indians did later, by striking together two hard stones or pieces of flint. After he discovered how to do this, he had camp fires, around which he and his companions squatted whenever they had need of warmth, and sometimes he made fires in the caves that served as homes.

Even yet the only cooked food was roasted on coals of wood, for there were no dishes or vessels in which to prepare it in any other way. A long time afterward, several centuries perhaps, somebody discovered that pots and bowls made of clay and baked would hold water; and thus pottery making started.

Somehow it happened, too, that some of the wild animals became tamed. Perhaps the first ones to be tamed, or domesticated, were the dog, horse, ox, and donkey. Man found out that he could make them drag loads and serve him in other ways.

Some of these early people noticed that seeds fell upon the ground, and from these seeds plants grew. Then they found that the seeds could be planted, and by tending the plants they could raise some of the things they wanted to eat.

We know a little of the life of early man from the re-

mains found in some of the caves of Europe, and from the pictures he left behind him, rude drawings painted on the walls of caves or scratched with sharpened stones or bones on pieces of bone and flint. The walls of Europe's caves have been the world's first history books, for they have brought to men of today knowledge of how their prehistoric ancestors lived, secured their game, and prepared their food, and even how they looked.

Kent's Cavern, or Kent's Hole, in southeastern England is one of the caves in which numerous remains of early man have been uncovered. Here, under a layer of stalagmite formed by the dripping of water during the centuries that have gone since the cave men vanished, were found numerous crude stone and bone weapons and flint implements.

A cavern in central England, which tradition says once gave shelter to Robin Hood, was dug into some years ago and proved to be a great find. Under a layer of earth, in which were embedded implements of both the Stone Age and the Age of Bronze, were found the bones of lions, hyenas, reindeer, bison, mammoths, hippopotamuses, and a rhinoceros.

Skeletons of these same animals have been found in Mother Grundy's Parlor, a cave in the north of England in Yorkshire. In numerous other places in the British Isles remains of creatures of the past have been uncovered, by means of which scientists have been able to piece out much of the story of animal life during the long ago.

In many different places on the continent also, caves have been history books. In the western Pyrenees is a cavern called Duruthy, hollowed out of limestone by a stream that flows into the Adour River. This is rich in remains of ancient animal and human life. As the excavators dug into the cave of Duruthy, they uncovered, first, a layer of stone that had fallen from the cliff above.

Next came a thick accumulation composed of bones of horses, oxen, stag, and reindeer, and also flint and stone implements. Above this layer was another made up of bones of animals, bear teeth perforated for use as necklaces, and implements of bone and flint. Most of the teeth of the necklaces were engraved, scratched with some sharp implement of stone or bone, and ornamented with pictures. One of these pictures is that of a seal with head and flippers very plainly drawn.

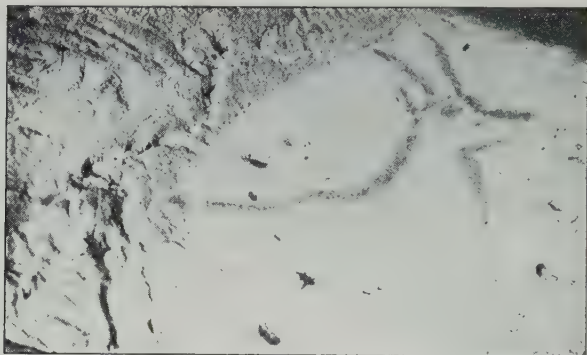
Some thirty miles north and east of the cavern of Duruthy is the Grotto of Montsepan, which, according to the word of a scientist who has been at work there recently, contains the oldest statues in the world. The Grotto of Montsepan is a great underground chamber still traversed by the stream that formed it, and whoever goes into it does so at considerable risk of losing his life in the deep dark pools. Scientists, however, do not hesitate because of danger that faces them, and a Frenchman named Nobert Casteret in 1923 braved the perils of the mysterious passages and the icy, unknown river, in the hope that he might find something of scientific value. He uncovered several clumsy flint tools that had been fashioned by cave men, also a bison tooth, the tooth of a horse, the skeleton of a small serpent, and the bones of many ancient animals, showing that this cave had been the shelter of both men and beasts during very remote times. But the most interesting of all, and the most valuable to those trying to piece together the story of human beings who lived upon the earth ages ago, were carvings on the rock, and crude, curious-looking statues made of clay. By the dim light of the candle the explorer could see the deeply cut figure of a bearded horse, with heavy features and an upstanding mane. As he wandered farther about the cave, he came upon the statues of several other horses, all carved on the rock, the head of a wild goat, as well as human heads much like those of the Neanderthal



*American Museum of Natural History.*

A Cro-Magnon making a picture of animals on the walls of a cave. Notice the palette on which he has his colors. Notice also the way the wall is lighted. (From a painting by Charles R. Knight in the American Museum of Natural History.)

and Heidelberg men. Besides the stone carvings, he found also figures made of clay, one of a horse, several of lions and tigers, and one of a bear. Nowhere else have explorers found statues of rock and clay that were made by the cave men



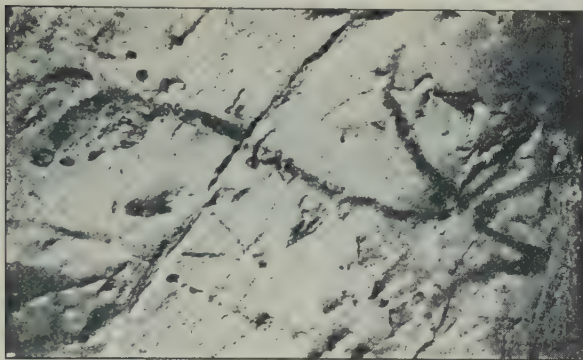
*American Museum of Natural History*

The figure of a chamois painted in red on the walls of a cave in Spain; the work of an artist of prehistoric times.

All over central and southern Europe, and even in Denmark, Norway, and Sweden are scattered caverns and gorges in which have been found skeletons, implements of flint and bone, and drawings upon pieces of flint and bone, that tell the story of prehistoric man in his struggle for existence.

Some of these drawings show considerable skill. In a cavern in England some years ago was found part of the rib-bone of a horse, on which was scratched the figure of a horse. From a cave in Germany was taken a reindeer antler on which was pictured a reindeer, and the work was done with such excellence that it would be no discredit even to an artist of today. The head of a brown bear is represented on a piece of hard rock uncovered in a cave in the Jura Mountains in Switzerland. On several bones and rock bits found in caverns of the Juras are pictured animal skins stretched out in the sun to dry. Others show hunting scenes, both men and animals being portrayed. One of the finest prehistoric drawings yet uncovered is from Duruthy Cave in the Pyrenees, where scientists came upon the bear-tooth necklace on which was scratched the seal. It shows a man hunting the aurochs, or great wild ox.



*American Museum of Natural History*

A stag painted in yellow, discovered by men who were searching in a cave in Spain for traces of the activities of people of the early Stone Age.

Drawings taken from some of the caves portray canoes, by which we know that early man, as he advanced from the first crude stage, learned to make rude boats. This was after he discovered the use of fire. With fire and tools of stone and bone he hollowed out trees to make his boats.

Not all people of the Stone Age lived in caves, because these shelters are found only in limestone regions or in volcanic débris, and there were not enough of them to go around. Many of the men and women of that period took refuge in hollow trees, or had encampments under a ledge of rock. Some dwelt in the open, without shelter of any kind, because they could do nothing else. It is believed that even those who were fortunate enough to find caves did not make their homes there all the time. The caves were mostly winter shelters. When summer came, the people moved out of them.

As human beings vacated the caverns, animals took possession, especially cave bears, hyenas, and saber-toothed tigers, which dragged in other wild creatures that were their prey. With the coming of winter, or when for any reason man wanted possession of the underground shelters,



*American Museum of Natural History*

Copy of paintings found on the walls of a cave in Dordogne, southern France, showing mammoths, reindeer, and horses. The drawings were evidently made at different times, the later ones being painted over the earlier ones, so that the figures of the animals are indistinct. The prehistoric people who could draw such pictures as these had made real progress toward civilization.

he drove the four-footed folk out and lived there himself until he chose to move on. It could not have been a comfortable existence, but people who know of no better conditions than those under which they live are not apt to think their lives very hard.

The story of the people of Europe during the Stone Age has not all been obtained from caves. On Salisbury Plain in southern England, at the place called Stonehenge, is to be seen an interesting record of earlier ages. There are many curious blocks of stone, some standing upright. Here and there a block is laid horizontally on two uprights or on one, while in a few places one slab is piled against another, forming an inverted V. All of these great stone masses have been worked by crude tools. It is believed that Stonehenge was the place of worship of some primitive people.

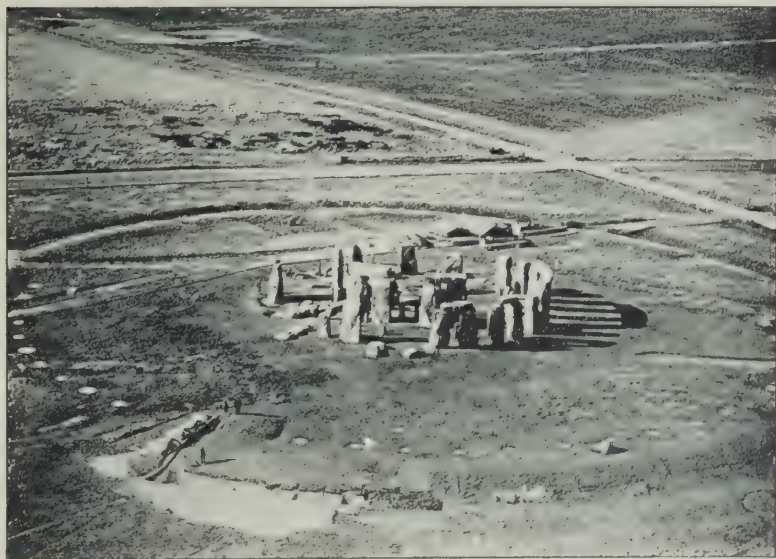
Very much like the relics at Stonehenge are those of Carnac, Brittany, in northwest France. The huge granite blocks at Carnac almost all stand upright, and some of them are sixteen feet high. There are more than a thousand in

all. They are arranged in rows, or avenues. Very likely these too were used by man for some purpose in the latter part of the Stone Age, but whether they served as a place of worship is not known.

## II. LIFE IN EUROPE DURING THE AGE OF BRONZE

Following the Stone Age came a period known as the Age of Bronze, so called because it was the time during which man began to use metals. He no longer lived in caves, but made rude shelters for himself.

These first houses were the poorest kind of huts and were built of clay or stone. Some of them, for the sake of protection from wild beasts and even wilder men, were set on piles driven into swamps or lake bottoms. A few of these ancient huts have been found submerged in the lakes of



*Central Aerophoto Co., Ltd.*

Looking down on Stonehenge from the air. On Salisbury Plain in southern England stands this group of great stone slabs, 16 to 18 feet in height, relics of prehistoric people, perhaps the ruins of a temple where they worshiped.

Switzerland. The people who made such shelters are known as lake dwellers.

Remains of these first dwellings in Europe have been found in many parts of the continent. They are most numerous in Ireland and in Switzerland, among valleys of the Juras, and along the lakes of Constance, Neuchâtel, and Zurich.

The lake dwellings of Switzerland were set on piles driven into the lake bottom well out from the shore. Across the piles were laid logs or planks to form a foundation, and upon these planks was set the house itself, a hut built of planks or clay, and sometimes of both. In the floor of each hut was a hole through which the owner did his fishing. Drawings on stones and bones dug out of lake beds in Switzerland show that the lake-dwelling mother tethered her children by ropes of skin to keep them from falling into the water.

In Ireland the lake dwellers made artificial islands to serve as foundations for their homes. First, rows of piles were driven into the lake bed. Between the piles were heaped earth and stones, upon which houses were set. Some of the lake dwellings of Ireland were built of stone, but usually the material was clay or wood. Most of them were circular in shape.

The artificial islands that furnished building sites for the lake dwellers of Ireland are called crannogs. Because many implements of the past have been taken out of them, they have proved very valuable to scientists. A hundred and fifty cartloads of bones and weapons were dug from one crannog alone.

On the crannogs of Ireland the people sometimes raised walls of stone and mud around their homes, making rude fortifications to give protection from the enemy. It was this idea, used long before the dawn of civilization, that during the Dark Ages led to the building of castles with walls and moat.





*American Museum of Natural History*

Lake dwellings of the period when man began to construct a shelter for his family. These houses were built on piles driven into the bed of the lake and were connected with the shore by bridges. Houses were grouped together like a small village perched on stilts above the water. It may have been wild beasts or troublesome human neighbors that forced these people to build houses surrounded by water. (From a model in Zurich, Switzerland.)

Besides having advanced to where they could build shelters for themselves, the men and women of the Age of Bronze were in every other way far ahead of the people of the Stone Age. Somebody had discovered that receptacles for holding food could be made by twining twigs and grasses in and out. Thus came about the weaving of baskets. Pottery making improved also, and with the development of pottery and basket making the art of cookery grew.

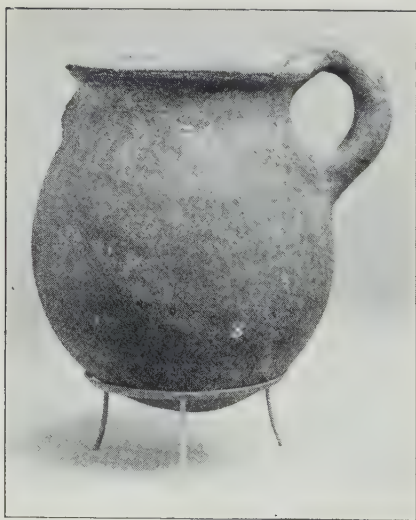
Life for man was broadening now. Little by little existence grew more comfortable, but the improvement was so gradual that centuries passed between the various changes. Through suffering, danger, and discomfort early man tried to find ways of making happier conditions for himself, and in striving and experimenting he groped his way toward civilization. It is very instructive to look back over the ages and think of the long, long way the race has traveled



from the cave-dwelling state to the enlightened life of today. It is a continuous march of progress, of struggling to surmount obstacles, of triumphing over difficulties, of creeping from darkness toward light.

It was the striving of those of ages past that made possible our present civilization. Each age passed on to the one that followed the results of its experience and invention. The cave dwellers and lake dwellers who improved upon the old ways of doing were just as much heroes of achievement as the master minds of today who are leading mankind steadily onward. The making of a new stone ax or bone needle in prehistoric times was as great an accomplishment, and meant as much to the development of the human race, as a mighty piece of engineering or a triumph in the field of manufacturing means in the twentieth century.

After prehistoric man learned to weave baskets, he found that by the same weaving process he could make mats of



*Metropolitan Museum of Art*

Jugs of polished red ware, made during the early Bronze Age.



*Metropolitan Museum of Art*

A strange vase made by people of the late Bronze Age  
(1500-1200 B.C.)

twigs and grasses with which to cover the floor of his house and add to his comfort in cold weather. He learned that clothing for himself could be woven out of grasses and tough substances found in the woods and plains. By experimenting and looking about for better material, he discovered that the fiber of various plants made finer and more durable woven stuffs than grasses, and so he came to weave cloth. He found, too, that the hair of animals could be woven into material that would make warm clothing. Always striving to find ways of making life more comfortable and pleasant, he acquired greater skill. It was this striving that brought about his first use of metals.

Stone was still largely used for weapons during the early Age of Bronze. Arrows, knives, saws, axes, and many other articles were made of stone, but these were highly polished and of far finer workmanship than the first crude stone objects man had fashioned. But now he discovered that by using metals he could make implements and ornaments that served him better and were more pleasing to the eye than those of stone. Copper was to be found in most of the regions where he lived, and he naturally took what was

near at hand. At first, by beating this metal into shape, he made axes, knives, daggers, bracelets, beads, earrings, and many other articles. Then he discovered that by melting and mixing copper with tin he could make bronze, a harder and more durable metal. So he began to form weapons, implements, and ornaments out of bronze, and thus the age in which he lived came to have its name.

Many bronze ornaments have been dug out of the crannogs of Ireland. In numerous places in the British Isles and all over Europe they have been found, some being dug out of mounds that served as burying grounds, while others have been uncovered around the ruins of ancient dwellings. Among these long-buried relics are many articles of beautiful workmanship — cups, knives, beads, daggers, and swords ornamented with carvings.

People in the Age of Bronze had ornaments of gold and silver, as well as of bronze, but these were rare, for gold was not so easily obtained as copper and tin. They made glass beads too, for in their use of fire they discovered that sand melted with lime or soda formed transparent glass, which they greatly prized. They had also beads and ornaments of amber, a transparent yellow substance, which is petrified gum from ancient trees. Amber takes a fine polish. For this reason amber ornaments were prized even more than those of glass.

During the Age of Bronze the people made more general use of domestic animals. They used oxen, buffaloes, sheep and goats, dogs, horses, and donkeys. Out of the wool and hair of the sheep and goats they made clothing. To begin with, the woven materials were coarse and crude, but they increased in fineness and beauty as the people became more skillful. In the latter part of the Age of Bronze the rich chiefs were clothed in linen and woolen materials. Those of Scandinavia wore woolen cloaks, and their legs and feet were protected by leather sandals and leggings. It was very

much the same in other countries. The style, color, and texture of dress varied according to the taste of the people or the materials available, and the garb of some was very attractive.

But the human race had still a long way to go before reaching the condition in which we find mankind at the beginning of the history of Europe as we really know it. Following the Age of Bronze came another long period of improvement, and this too extended over many centuries. It is known as the Iron Age.

### III. LIFE IN EUROPE DURING THE IRON AGE

The Age of Iron has its name from the fact that during this period iron, a metal scarcely known in the Age of Bronze, came into use. Iron is not found pure in nature but has to be obtained by smelting certain rocks or earthy materials (iron ores).

Man now constructed more comfortable dwelling places, and his pottery and weaving had greatly improved. His swords, spears, and daggers were more skillfully formed. He had chariots and rude wagons in which to ride, and these were drawn by oxen and horses, often decked in bronze or iron trappings. Clothing was more skillfully woven. In fact, woven stuffs now became quite beautiful.

Coined money came into use. Coins of silver and copper were given in payment for articles of value, and so, in the Iron Age, we see the beginning of commerce. The canoes of the Age of Bronze developed into boats propelled by many pairs of oars, instead of one pair. Some boats had ten and even twelve sets of oars. Men began to travel farther and farther from home, and thus the Iron Age saw the development of navigation.

Through centuries and ages the peoples of Europe had developed slowly and steadily, until they reached the

*Museum d'Histoire Naturelle, Paris*

People of the Iron Age in western Europe. It was such men that Cæsar and his armies came upon in their conquest of France and Germany. By this time horses and cattle and crude wagons were in common use. All these greatly aided the people of the Iron Age in their everyday affairs. (From a painting by F. Cormon in the Museum d'Histoire Naturelle, Paris.)

threshold of civilization, the period when written history begins.

You must not think that men in all parts of Europe were living under the conditions of the Stone Age, the Age of



Bronze, or the Iron Age at the same time. In some regions they reached civilization far earlier than in others. While in Britain, France, and Scandinavia people were lake dwellers and even cave men, Greece and Italy were not only civilized lands, but centers of splendid culture. Julius Cæsar left brick and marble palaces in Rome, but found among the forests of Gaul (France) the mud and wooden houses of the Iron Age.

The southern part of Europe reached civilization earlier than the northern lands. But in every portion of the world men passed through the same stages of development as they grew from savagery to enlightenment. First they were rough creatures whose only food was the game they brought down with stones, together with the roots, nuts, and fruits found in the forests, and all these foods they ate raw. Their homes were caves and hollow trees. Then they moved on through the Stone Age, the Age of Bronze, and the Iron Age, until, at the beginning of written history, they had better houses and more comfortable ways of life. But still they were struggling, striving, seeking to improve the conditions under which they lived.

Men are striving still to find ways of doing things that will make life pleasanter. All the while they are reaching out for knowledge that will increase human comfort and happiness, just as in the beginning the cave man labored to make a better weapon with which to get his food, or the lake dweller labored to build a more secure and pleasant shelter to protect him from the storms.

We have told you a little about some of the high lights of geography in Europe, of shore lines that have been changing since the dawn of time, of rivers born among glaciers and doing their work of extending coasts into the sea, of fjords that once were valleys watered by swift streams, and of lakes that did not exist until slow-moving ice rivers scoured

their beds or blocked up streams with débris. We have told of some of the animals of ancient times, and of animals and birds of today. We have told, too, just a little about early man and his struggle as he moved through the ages. We hope you have read enough to make you want to see the wonders for yourself. And whenever you stop to think of how those shore lines, lakes, and gorges came to be, and of how soil carried down from the mountains by rains and rivers formed the plains that have become the farm lands of Europe, you will realize what a wonderful world we live upon, and what a marvelous builder nature is. The better we know our world and its inhabitants, the more ready we are to "tread the crust of the earth in adoration."

# COUNTRIES OF EUROPE

POPULATION, AREA, AND CAPITAL

COUNTRY	AREA (Sq. Mi.)	POPULATION	CAPITAL OR CHIEF CITY
Albania . . . . .	17,364	831,877	Tirana
Andorra . . . . .	191	5,231	Andorra
Austria . . . . .	32,396	6,526,661	Vienna
Belgium . . . . .	11,752	7,600,000	Brussels
Bulgaria . . . . .	40,667	4,958,400	Sofia
Czecho-Slovakia . . . . .	54,877	13,613,172	Prague
Danzig . . . . .	729	364,380	Danzig
Denmark . . . . .	17,144	3,352,000	Copenhagen
England . . . . .	50,874	35,678,530	London
Estonia . . . . .	18,355	1,110,538	Reval
Finland . . . . .	149,641	3,366,507	Heisingfors
France . . . . .	212,659	39,402,739	Paris
Germany . . . . .	185,889	59,858,284	Berlin
Greece . . . . .	41,933	5,447,077	Athens
Hungary . . . . .	35,911	7,945,878	Budapest
Iceland . . . . .	39,709	94,690	Reykjavik
Ireland . . . . .	32,586	4,390,219	Dublin, Belfast
Italy . . . . .	117,982	38,835,941	Rome
Jugo-Slavia (Serb, Croat, Slovene State)	96,134	12,017,323	Belgrade
Latvia . . . . .	25,000	1,885,870	Riga
Liechtenstein . . . . .	65	10,716	Vaduz
Lithuania . . . . .	33,000	2,011,173	Kovno
Luxemburg . . . . .	999	260,767	Luxemburg
Monaco . . . . .	8	22,956	Monaco
Netherlands . . . . .	13,205	7,086,913	The Hague
Norway . . . . .	124,064	2,649,775	Oslo
Poland . . . . .	149,140	29,160,163	Warsaw
Portugal . . . . .	35,490	5,628,610	Lisbon
Rumania . . . . .	122,282	17,393,149	Bucharest
Russia . . . . .	8,273,130	133,442,065	Moscow
San Marino . . . . .	38	12,027	San Marino
Scotland . . . . .	30,405	4,882,288	Edinburgh
Spain . . . . .	190,050	21,347,335	Madrid
Sweden . . . . .	173,151	5,987,520	Stockholm
Switzerland . . . . .	15,976	3,880,320	Berne
United Kingdom . . . . .	95,041	44,147,601	London
Wales . . . . .	7,466	2,206,712	Cardiff



## PRONUNCIATION LIST

The markings of the letters are in accordance with Webster's *New International Dictionary*.

Adelsberg ä'dëls-bërg	Campagna kām-pän'yä
Adige ä'dë-jä	Capri kă'prë
Adour â-dōōr'	Carcassonne kār-kā-sōn'
Adriatic äd-rī-ät'ic	Cattaro kät'tä-rō
Ægean ê-jë'än	Cettinje tsët'en-yä
Agassiz äg'ä-sī	Cévennes sâ-vën'
Aigues-Mortes ëg-môrt'	Chamonix shâ-mô-në'
Aiguille â-gwël'	Charlemagne shär'lë-mān
Ailsa Craig āl'sä kräg'	Chillon shë-yôn'
Allée Blanche à lā' blānsh'	Chios kī'ös
Allier â-lyā'	Cirque sûrk
Alsace äl-säs'	Coblenz kō'blënts
Andorra än-dör'ä	Cologne kô-lōn'
Annecy ân-së'	Connaught kōn'ôt
Aosta ä-ôs'tä	Cordova kôr'dô-vä
Apennines äp'ë-nīnz	Corfu kôr-fōō'
Ardenne är-dën'	Corniche d'Or kôr'nësh dôr
Argentièrë är-jën-tyër'	Courmayeur kôr-mä-yër'
Arles ärl	Cremona krë-mō'nä
Aude ôd	Crete krët
Aurochs ô'röks	Croatia krô-ā'shī-ä
Auvergne ô-vërn'y'	Cyclades sīk'lâ-dëz
Avignon â-vën-yôn'	Cyprus sī'prūs
Baden bā'dën	Czecho-Slovakia
Bagnes bāny	chëk'hō-slō-vä'kī-ä
Balaton bö'lō-tōn	Dalmatia däl-mā'shī-ä
Basel bā'zel (Fr. bäl)	Dardanelles dār-dä-nëlz'
Bern bërn	Dauphiné dō-fë-nä'
Bernese bër'nës	Delos dë'lös
Bodensee bōd'än-zä	Dent Blanche dän blānsh'
Bœotia bë-ō'shī-ä	Dniester nës'tër
Bordeaux bôr-dō'	Dodecanese dō-dë-cä-nës'
Bosporus bös'pō-rūs	Doire doi'rë
Brienz brë ënts'	Dolomites döl'ô-mīts
Bruges brüzh	Dora Baltea dô'rä bäl'tä-ä
Budapest böö'dä-pëst	Dordogne dôr-dôn'y'
Byzantium bë-zän'shī-üm	Dovrefjeld dôv'rë-fyäl'



Düna dü'nä	Lauteraar lou'tēr-är
Edinburgh ɛd''n-bür-ō	Lauterbrunnen lou'tēr-bröön-ën
Ehrenbreitstein ā-rën-brüt'shtīn	Le Breuil lē brē'y'
Elbe ɛl'bē	Le Havre lē av'r'
Engadine ɛn-gä-dēn'	Leinster lēn'stēr
Entrèves ɔntr-äv'	Les Écrins lā zā-krān'
Eubœa ū-bē'ä	Leyden lī'dēn
Finsteraar fīn'stēr-är	Liebenstein lē'bēn-shtīn
Fjeld fyēld	Liechtenstein lēch'tēn-shtīn
Fjord fyōrd	Linz līnts
Folgefonden föll'gē-fōn-dēn	Lipari līp'ä-rē
Fontainebleu fōn-tēn-blō'	Lithuania līth-ū-ä'nī-ä
Fréjus frā-zhüs'	Loire lwär
Garonne gä-rōn'	Lorelei lō'rī-lī
Gavarnie gä-vär-nē'	Lorraine lōr-rān'
Gave de Pau gäv dē pō	Lough Neagh lūf nā
Genil hā-nēl'	Lourdes lōōrd
Genoa jēn'ō-ä	Lucern lū-sūrn'
Granada grā-nä'dä	Lütschine lüt'shēn
Griez grē	Lyon lē-ōn'
Grisons grē-zōn'	Macedonia mäs-ē-dō'nī-ä
Guadalquivir gō-däl-kwiv'ēr	Maggiore mäd-jō'rā
Hardanger här-däng'ēr	Main mān
Heidelberg hī'dēl-bērg	Mainz mīnts
Heligoland hēl'ī-gō-länt	Maloja mä-lō'yä
Herculaneum hūr-kū-lä'nē-üm	Mannheim män'hīm
Herzegovina hēr'tsē-gō-vē'nä	Mantua män'tū-ä
Ill ɛl	Marmara mär'mä-rä
Ionian ī-ō'nī-än	Marmore mär'mō-rä
Ischia ɛs'kyä	Marseille mär-sä'y'
Ischl یش'l	Melos mē'lōs
Jostedals Brae yō'stē-däls-brä'	Mentone mēn-tō'nä
Jugo-Slavia yōō'gō-slä'vī-ä	Meran mār-rän
Jungfrau yōōng'frou	Mer de Glace mēr dē gläs'
Jura j'ōōrä	Meuse mûz
Katzellenbogen kät-zēl'ēn-bō-gēn	Milan mī'län
Kazan kâ-zän'	Milo mē'lō
Lac de l'Étoile läk dē lā twōl	Mincio mēn'chō
Lac Noir läk nwär	Mischabelhorn mē-shä'bēl-hörn
La Meije lä mā	Monaco mōn'ä-kō
Languedoc läng-dōk'	Mont Blanc mōn blänk'

Monte Epomeo mōn'tā ē-pō-mě'ō	Rhodes rōdz
Montenegro mōn-tā-nā'grō	Rhodope rōd'ō-pē
Monte Nuovo mōn'tā nwō'vō	Rigi rē'gē
Montreux mōn-trū'	Riviera rē-vyā'rā
Montserrat mōnt-sē-rāt'	Rjeka rē'kā
Morava mō'rā-vā	Rjukanfos rōō'kän fōs
Moray mūr'ā	Rouen rōō-ān'
Moselle mō-zěl'	Rüdesheim rü'dēs-hīm
Mytilene mīt-ī-lē'nē	St. Gallen gāl'ēn
Nantes nānts	St. Gotthard göth'ārd <i>or</i> gō-tār'
Narbonne nār-bōn'	St. Moritz mō'rīts
Neanderthal nā-ān'dēr-tāl	Salisbury sōlz'bēr-ī
Neuchâtel nū-shā-těl'	Saloniki sālō-nē'kē
Nice nēs	San Remo sän rē'mō
Niederwald nē'dēr-vält	Santorini sän-tō-rē'nē
Nikaria nyē-kā-rē'ā	Saône sōn
Nîmes nēm	Schaffhausen shāf-hou'zēn
Oberammergau ō-bēr-ām'ēr-gou	Schönberg shūn'bērg
Odda ōd'ā	Schwarzwald shvārts'vält
Onega ō-nē'gā	Schwyz shvēts
Orleans ōr-lā-ān'	Scutari skōō'tā-rē
Pelion pē'li-ōn	Seine sän
Pennine pēn'īn	Seville sē-vīl'
Pfalzgrafenstein	Siebengebirge zē'bēn-gē-bīr'gē
pfälts-grāf'ēn-shtīn	Simplon sīm'plōn <i>or</i> sän-plōn'
Piave pyā'vā	Skagerrak skäg'ēr-āk
Piedmont pēd'mōnt	Skjäggedalfos skäg'ī-dāl-fōs'
Pieve di Cadore	Smyrna smūr'nā
pyē'vā dē kā dōr'ē	Snehaetten snē hāt'tēn
Pilatus pē-lä'tōōs	Sogne Fjord sōg'nā fyōrd
Pisa pē'sā	Spalato spā'lā-tō
Piva pē'vā	Spey spā
Pompeii pōm-pā'yē	Splügen shplü'gēn
Portici pōr'tē-chē	Sporades spōr'ā-dēz
Pozzuoli pōt-swō'lē	Stavanger stā'vàng-ēr
Provence prō-vāns'	Suir shoōr
Pyrenees pīr'ē-nēz	Swansea swōn'sē
Ragusa rā-gōō'zā	Tagus tā'gūs
Ravenna rā-vēn'ā	Tarascon tā-rās-kōn'
Reichenberg rī'kēn-bērg	Tarbes tārb
Repos de l'Aigle rā'pō dē lī'gl'	Tempe tēm'pē

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